THE AUSTRALIAN NAVAL ARCHITECT

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NUSHIP *Brisbane* underway for the first time on 20 November to begin her first sea trials
(Photo courtesy Department of Defence)

THE AUSTRALIAN NAVAL ARCHITECT

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Cover Photo:

The Incat -Tasmania-built ferry *Fred Hollows* operating the Taronga Zoo service on a busy Saturday afternoon. The new ferries are now becoming a familiar sight on Sydney Harbour
(Photo John Jeremy)

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From the Division President

Martin Renilson

Welcome to another edition of *The Australian Naval Architect.*

It was really good to meet with so many members at the Pacific 2017 International Maritime Exposition in Sydney. Again, the International Maritime Conference, jointly organised by RINA, IMarEST and EA, was very successful. This was as a result of the efforts put in by many people. Particular thanks go to John Jeremy, Chair of the organising committee and Adrian Broadbent, Chair of the program committee and, of course, all the members of these committees. I know that for this conference to be successful it requires a considerable effort "behind the scenes".

As usual, the Institution had a stand in the exhibition, arranged by our Chief Executive, Trevor Blakeley. I'd like to thank all the members who took it in turns to help him to crew it. I know that quite a few people dropped by to say hello and there were a number of membership enquiries, along with some lapsed members who re-joined! It was good to see Trevor again, and the Division is extremely grateful for the effort which he regularly puts in to attend this conference.

I also enjoyed the inaugural Victorian Maritime Industry Social Event which was on 25 August 2017. I had the opportunity to meet with many members and others in the industry in a very convivial atmosphere. Although billed as a social event, there were a quite few brief technical presentations which were very interesting. I'd like to thank Jesse Millar and his team for arranging this event. Hopefully this is the first in an annual series of such occasions. If you weren't able to make it this year, then I strongly recommend that you attend next year.

I know that I've mentioned this before, but the defence shipbuilding industry is really booming in Australia now. There is a number of major shipbuilding acquisitions underway, and it is certainly a very exciting time to be involved in the maritime defence industry in Australia. I've seen different estimates of the number of naval architects which are required, all higher than the number that are available. The lack of naval architects in Australia has been mentioned a number of times at the recent enquiry into the future of Australia's naval shipbuilding industry.

The Government does seem to have recognised that more trained staff are required in the industry and is now establishing the Australian Naval Shipbuilding College in Adelaide. We've written to the Minister for Defence Industry offering to provide guidance on the education, skilling and development of the workforce required to build and support the Navy's warships. Amongst other things, we have offered to assist with career paths from apprentice through to professional accreditation and beyond. We copied this offer to the Minister for Education and at the time of writing have had an acknowledgement from his office, but not yet one from the Minister for Defence Industry. If any members are interested in a copy of our submission, then they can obtain this from the Secretary.

There is still a lot of activities in the development of the processes for the single national jurisdiction and I'm pleased to see that there is another article from AMSA about it in this edition. It's really good to be engaged with AMSA on this important development in Australia. I encourage all members in this field to work with AMSA to help to bed the new system down. Please let the Division Council know of any problems in this area so that we can take concerns directly to AMSA. However, the general impression that I have been getting is that things are improving and it is great to get such positive feedback which we can also pass to AMSA.

It is pleasing to hear that there are also green shoots of recovery in the offshore oil and gas industry. I gather that it is still tentative at this stage, but it seems that the level of activity is increasing, albeit from a low base. Let's hope that this continues.

In addition, the level of activity in marine renewables is increasing as well. This is quite an exciting area of the maritime industry; for example, I have just read about the world's first floating wind farm which is 25 km off the east coast of Scotland. I know that there is a lot of development in Australia, and look forward to hearing more about them in future. I'm sure that there are very interesting topics here for section technical meetings and articles in *The Australian Naval Architect*.

It has been pointed out to me recently that the term "unmanned underwater vehicles" (UUVs) is sexist, and we should avoid using this. Perhaps it is already too late ;however, I'd be interested in member's comments as to what an alternative could be.

Of course, "autonomous" has a different meaning and can't just be used to replace the term "unmanned". In the underwater vehicle field the term unmanned underwater vehicle (UUV) refers to any underwater vehicle which has no humans on board. This is then divided into two categories "remotely operated vehicles", (ROVs) where there is an operator, who sits remotely from the vehicle, and "autonomous underwater vehicles" (AUVs) which have no operator, but rely on their own "intelligence". The

technology for the two is different, and the autonomous capability is quite a special field in its own and, of course, not unique to the maritime environment.

I guess that, as surface ships are developed to operate with nobody on board, there will also be the two distinctions — when they are operated remotely (like remotely-operated aircraft or drones) and where they are operated in the autonomous mode.

So, now might be a good time to get the terminology right. I note that some people refer to remotely operated aircraft as "pilotless".

Finally, I would like to say how much I am looking forward to the next Sydney Marine Industries Christmas (SMIX) Bash. This will be held in Sydney on 7 December, and I look forward to seeing many of you at this event. Tickets can be obtained from www.trybooking.com/298279.

Martin Renilson
President

Editorial

The Pacific 2017 International Maritime Conference was held on 3 to 5 October, in conjunction with the Pacific 2017 International Maritime Exposition which was organised and managed by Industry Defence and Security Australia Ltd (IDSAL). The partnership between the organising institutions of the IMC and IDSAL (previously known as Maritime Australia Ltd) goes back to 2000. This year's event was the tenth in which we have been involved.

Pacific 2017 was outstandingly successful. The number of participating exhibitors exceeded 500 for the first time, at 546. There were 16 765 attendances during the event, up 12% on 2015. There was a record number of senior military and industry delegations — 79 from 53 nations. In addition to the IMC and the RAN Sea Power Conference there were another 16 conferences, seminars and symposia held during the event.

The IMC was one of the most successful we have organised. We were offered 139 papers for the 70 slots available in the program. Inevitably some who submitted abstracts were disappointed, which was unavoidable in these circumstances. 377 people registered for the conference and the final financial outcome was very satisfactory for the organising institutions.

None of this happens by accident. The IMC could not happen in its present format without the outstanding support which we receive from IDSAL. Members of the organising committee and, particularly, the program committee chaired by Adrian Broadbent, put in many hours over the eighteen months leading up to the IMC on a purely voluntary basis. We owe them all a great vote of thanks. The contribution made by the conference sponsors is also greatly appreciated.

The team will begin planning for the Pacific 2019 IMC in May 2018. Pacific 2019 will be held again at the International Convention Centre at Darling Harbour, Sydney. The new facility there presented a few challenges this year but the experience has been taken on board for future planning.

Pacific 2019 will be held on 8 to 10 October 2019. Put the date in your diary now — I hope to see as many of you there as possible.

On a completely different subject, as I write Sydney is in something of a twitter over the decision to name the last of the six fine new Sydney ferries being built by Incat in Tasmania *Ferry McFerryface*, would you believe! Apparently it was a very popular suggestion in the naming competition held to name the six vessels. It certainly breaks with tradition, and opinion seems to be quite polarised between those who think the name is appalling and disrespectful to those people after whom the other ferries have been named, and those who think it is a bit of fun which tourists and children will love.

Of course, ship owners can name their ships anything they like, within reason. There has, of course, been the odd case when the selected name was changed when another meaning had supplanted the original, like the tanker which was named after a planet in the solar system, *Titan Uranus,* renamed *Titan Taurus* (so the Internet tells me).

One thing is quite certain. Already *Ferry McFerryface* has attracted a lot of attention to Sydney's ferries and if she entices more people to travel by ferry on one of the finest harbours in the world, then that is fine. She can simply join the other odd one out, *Supercat 4*, in the Sydney ferry fleet. I plan to remain strictly impartial, if possible.

John Jeremy

Rarely are so many gaff-rigged yachts seen crossing a starting line in Sydney. On 8 October 23 couta boats took part in the Sydney Amateur Sailing Club's Gaffers Day. NSW boats were joined by others from Victoria and Western Australia to compete for the Thistle Cup (Royal Price Edward Yacht Club), Muriel Trophy (SASC) and the Wattle Cup/National Championships conducted on Pittwater by the Avalon Sailing Club
(Photo John Jeremy)

LETTER TO THE EDITOR

Dear Sir,

A very interesting part of naval warfare is the mine as a weapon of stealth. There are many different types, ranging from simple 'contact mines' to the more sinister 'influence mines' which wait for an acoustic or magnetic signature from a large target to detonate for the most strategic impact.

Mine clearing is a messy and expensive business and, despite the US and Soviets training 'military dolphins', there are still hundreds of thousands of mines still out there. The sad truth is that *The cost of producing and laying a mine is usually anywhere from 0.5% to 10% of the cost of removing it, and it can take up to 200 times as long to clear a minefield as to lay it*. Between 600 000 and 1 000 000 naval mines of all types were laid in WW2; however, many of these were laid in randomised locations due to air-dropping.

The strength and proximity of a mine determines the "shock factor value" — whether the direct damage will cause flooding or sinking, or other types of damage such as the 'bubble-jet effect', or the most powerful 'shock effect' which will dangerously shake both machinery and crew on board. I'm sure any naval architect would find the science of sinking ships painful, like seeing a Lego model, which took ages to build, being smashed to pieces, not to mention the loss of life and cost of resources in building and maintaining any ship. The ultimate tragedy of mines is that such unnecessary harm is caused deliberately. And, as if that's not enough, there are even dummy mines which are rolled off ships simply to slow down the process of mine clearing. An unexploded WW2 bomb was found in the River Thames in January this year!

Aside from the physical damage, mines are tools of psychological warfare, such as 'Operation Starvation' blocking Japanese sea routes in WW2. In all, 293 Japanese merchant ships were sunk or damaged, and clearing the major shipping lanes after the war took so many years that the task was eventually given to the Japan Maritime Self-Defence Force. There are passive countermeasures, such as 'degaussing' invented by the British, which demagnetise the ship's hull and prevent it from detonating mines with its magnetic signature, as well as sonar to warn of danger ahead.

Government and humanitarian organisations are tackling the active countermeasure of sweeping the leftover mines and there are many fascinating technologies for disarming mines which are worthwhile to explore yourself!

The Huon-class minehunters are six ships in the Royal Australian Navy built with fibreglass hulls. In the event of a ship triggering a mine, the ship can elastically deform and 'jump' from the force of impact. The ships have now been put into reserve or are being repurposed as hydrographic or patrol vessels, and are being replaced by multi-purpose offshore combatant vessels in the future.

Maybe I'm a starry eyed dreamer — but it would be a joy to see the Huon-class vessels complete their mission and be the final required mine-countermeasures vessels. I would love it if, in my lifetime, mines are remembered as an intriguing but recklessly-destructive part of naval warfare, and we turn our attention to constructive technologies.

Ellen Ziegelaar
UNSW Student

[*The Huon-class minehunters are to be upgraded to provide a maritime mine-countermeasures capability into the 2030s, see* The ANA, *August 2017, p. 20* — Ed.]

COMING EVENTS

NSW Section

The seventeenth SMIX (Sydney Marine Industry Christmas) Bash will be held on Thursday 7 December aboard the beautifully-restored *James Craig* alongside Wharf 7, Darling Harbour, from 1730 to 2130. This party for the whole marine industry is organised jointly by RINA (NSW Section) and IMarEST (NSW & ACT Branch). Join your colleagues in the maritime industry and their partners for drinks and a delicious buffet meal on board the unique 19th century iron barque. Cost is $55 per head. Dress is smart casual, but absolutely no stiletto heels!

Those wishing to attend this Sydney Maritime Industry Christmas Party should purchase their tickets through www.trybooking.com. Search for SMIX and follow the prompts. Payment is only accepted by Visa and Mastercard. Alternatively, you may mail your details (including names of guests and your email address for confirmation of booking), together with your cheque, to the RINA (NSW) Treasurer, Adrian Broadbent, at 27 Manning St, Queens Park NSW 2022.

There is a maximum limit of 225 attendees on the James Craig and we have had to turn away members and friends in previous years; so you are urged to book early.

Contract Management for Ship Construction, Repair and Design

Fisher Maritime's widely-respected three-day training program, *Contract Management for Ship Construction, Repair and Design*, will be available as follows:

Auckland, NZ	22–24 January 2018
Sydney, NSW	31 January–2 February 2018
Henderson, WA	7–9 February 2018

This program is a lessons-learned one, not a theoretical course on contract management. It bears a lot of "scar tissue" from marine contractual disasters. It is designed for:

- Project Managers (Yards and Owners)
- Contract Managers and Specialists
- Newbuilding Shipyards, Repair Yards
- Fleet Managers
- General Managers of Shipyards
- Financial Managers (Yards and Owners)
- Ship Conversion Specialists
- Naval Architects, Marine Surveyors
- Federal, State, and Provincial Agencies
- Ferry Operators (Public and Private)
- Naval Shipyards
- Owner's Representatives

- On-Site Representatives
- Major Equipment Vendors
- Marine Superintendents
- Consultants and Attorneys

The presenter, Dr Kenneth Fisher, is recognised worldwide as the leading authority on the development and management of complex contracts and specifications for ship construction, conversion, repair, and design. He is author of the 2004 RINA publication, *Shipbuilding Specifications: Best Practices Guidelines*, and of the 2003 SNAME publication, *Shipbuilding Contracts and Specifications*. As an arbitrator, expert witness, consultant, and instructor for over 30 years, he brings clarity and organization to an otherwise-complex set of management requirements unique to the maritime industry.

This valuable program has bestowed significant benefits on the over 5000 professionals who have attended. It has been conducted over 440 times worldwide, including to more than 50 times in Australia and New Zealand. It is accredited by RINA and SNAME. This training enables you to define, understand, and appreciate the language of the contract to maximise benefits during ship construction, repair and design. Participation in this program will assist you dramatically by improving your professional project-management skills, vital to the cost-effectiveness of your work and essential to the long-term success of your organisation.

Complete program information (a six-page brochure) is included with this edition of *The ANA* and can be found at www.fishermaritime.com/nzaus2018.

HPYD6

HPYD is the series of conferences on high-performance yacht design organised by the Royal Institution of Naval Architects NZ and the University of Auckland. The first conference was held in December 2002. Since then, the conferences in 2006, 2008, 2012 and 2015 have showcased the latest developments in yacht research from around the globe. The conference enables naval architects, engineers, designers and researchers to present and hear papers on the current state of high performance yacht and power craft technology.

The High Performance Yacht Design Committee has announced that HPYD6 will take place in Auckland, NZ, on 10–13 March 2018 during the stopover of the Volvo Ocean Race.

Due to a lack of high-quality technical abstracts submitted, the HPYD committee has made the decision to change the format of the HPYD6 conference. As such, there will be no publication of papers and no formal conference presentations. Instead, there will be a focus on providing a range of exciting, publicly-accessible presentations and keynote addresses delivered by some of the top designers and engineers involved in the America's Cup and Volvo Ocean Race.

Planning for HPYD7 has already begun. It will coincide with the America's Cup in Auckland in 2021, and will return to a more traditional format with a full complement of papers and speakers.

You can follow HPYD on Facebook, LinkedIn or sign up for their mailing list to receive the latest news.

See www.hpyd.org.nz for more details or, for general information, email info@hpyd.org.nz; for registrations: registrations@hpyd.org.nz; or for sponsorship opportunities: sponsorship@hpyd.org.nz

NEWS FROM THE SECTIONS

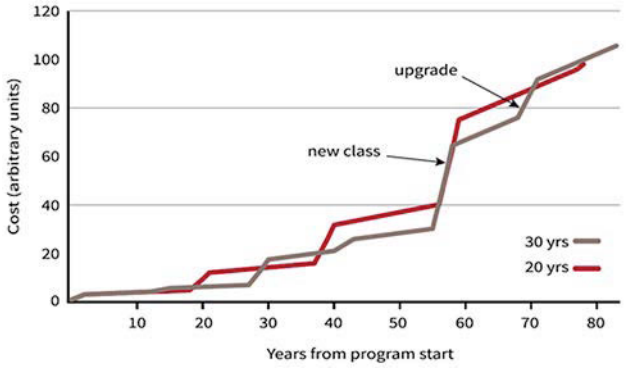
ACT

On 23 August members of the ACT Section met at the Campbell Park Offices in Canberra for a presentation by CMDR Alastair Cooper who gave a very interesting and insightful talk examining options for warship service lives. His talk, *Upgrade or Replace: A Cost Comparison of Australian Warship Service Lives* continued one of the ACT Section's technical meeting themes of 'Australian continuous naval shipbuilding', and complements RADM Uzzell's talk from earlier in the year [1]. CMDR Cooper's talk addressed the question of "How long should the service life of a warship be?" and was initiated from the premise that typical historical thinking of '30 years with a mid-life upgrade' is perhaps too narrow a view.

CMDR Cooper's approach was to look for two sources of evidence to substantiate a re-thinking of service lives — historical and economical. A review of navies since World War II showed that, in general, naval ships tended to have a service life somewhere between 24 and 33 years (an interestingly wide range, I thought). A notable exception was that the Royal Navy prior to the 1980s had a tendency to keep destroyers in service for only 15 – 20 years (the reason for this is not clear).

I will not attempt to reproduce CMDR Cooper's economical work here, both due to the likelihood of misrepresenting it, which would not be fair to CMDR Cooper, and because it can be read in full in the paper he published with James Mugg from the Australian Strategic Policy Institute (ASPI); the paper has the same title as this technical presentation and can be found in ASPI's *Strategic Insights* of April 2017.

To jump directly to the conclusion, CMDR Cooper ascertained that, over an extended period of time, there is relatively little difference in cost between a ship having a 30 service life with a mid-life upgrade, and having a 20 year service life with no mid-life upgrade. This is illustrated by a graph (from CMDR Cooper and James Mugg's paper) and suggests that a broad range of service lives is practicable, with little to choose between them, giving some flexibility for the implementation of a continuous naval ship building program.



Cost comparison between 30 year life with mid-life upgrade and 20 year life with no upgrade

A couple of interesting points which CMDR Cooper made during the course of his talk are worth repeating,

The first was that a continuous shipbuilding program can provide a navy with significant strategic agility, in terms of aspects like 'rapidly' adding the latest technology to a fleet, or increasing the size of a fleet to respond to emerging threats, but *only* if the industry base is capable of implementing these changes.

The second was that it may be possible to significantly extend the service lives of ships which are already in service, but only if the design basis for those ships is intimately known by the Navy (or perhaps by local industry). This intimate knowledge can be gained through careful development of a continuous naval shipbuilding program.

1. "Naval Engineering in a Continuous Shipbuilding Environment – an enterprise approach", 21 February 2017, *The Australian Naval Architect*, August 2017.

John Colquhoun

Victoria

In late September a presentation entitled *Assuring Submarine Manoeuvring and Control Safety* was given by Paul Crossland from QinetiQ UK to a joint meeting of RINA and IMarEST, kindly hosted by BMT Design & Technology in Melbourne.

The submarines of today are generally described as one of the most-complex systems-engineering design challenges, particularly in the context of the changes in submarine operations since the end of the Cold War; changes which involve concepts and doctrine shifting towards supporting national interests in regional crises and conflicts around the world.

The modern submarine is an important component in joint operations and is capable of conducting covert operations in areas far from the port of origin. One aspect of submarines which has not changed is that safety is imperative — service in submarines has always been regarded as potentially hazardous, but exacting standards in training, submarine design, and maintenance have reduced the occurrence of operator-error-induced accidents and catastrophic component failures.

The requirement to manage the safety of a submarine whilst at sea necessitates a number of key factors being understood. One of those factors is the ability to understand the manoeuvring and control behaviour of the submarine throughout the design process. This capability should be able to explore the safe operating boundaries of the submarine during the early design phases, ensuring that unsuitable designs are not taken through to build, and to ultimately provide safety guidance for at-sea operations. Moreover, to ensure safe operation an ensemble of capabilities is required ,which includes theoretical tools, physical-model tests and full-scale trials.

This presentation described QinetiQ's approach to providing the evidence for assuring submarine safety. This approach has been developed over many years of testing and providing support to the UK Ministry of Defence in developing guidance and evaluation toolsets for the benefit across the design process.

Siobhan Giles

New South Wales

Committee Meetings

The NSW Section Committee met on 29 August and, other than routine matters, discussed:

- SMIX Bash: Accounts for 2016 have been finalised, and we broke even; *James Craig* has been booked for 2017, and the catering has been arranged; sponsors are being contacted.
- Engineers Australia Agreement: currently under discussion.
- Technical Meeting Program and Venue 2018: RINA to organise five presentations in 2018 and IMarEST four; we already have three in the pipeline, with several more suggestions. However, depending on the outcome of the agreement with Engineers Australia, we may be looking for a new venue in 2018; a number of venues suggested and to be checked.
- Pacific 2017: IMC Conference Organisers have offered RINA a brochure table and stand-up banner space in the foyer outside the Conference Rooms; delivery of the stand-up banner to the Conference be arranged; crewing of RINA stand at the Exhibition to be arranged via the Australian Division.
- RINA Australian Division Technical Library: Members should be aware of the Technical Library which is available on the Australian Division website, containing PDF copies of the papers presented to the Division between 1955 and 1996, with some from Ausmarine 2000 included for good measure; an article giving the URL is elsewhere in this issue of *The ANA*.

The NSW Section Committee also met on 17 October and, other than routine matters, discussed:

- SMIX Bash 2017: We definitely need more sponsors, and this will be the main focus for the moment.
- Technical Meeting Venue for 2018: Other venues and costs being investigated, and arrangements with Engineers Australia to be negotiated.
- Technical Meeting Program 2018: We have five presentations signed up for 2018.

The next meeting of the NSW Section Committee is scheduled for 13 February 2018.

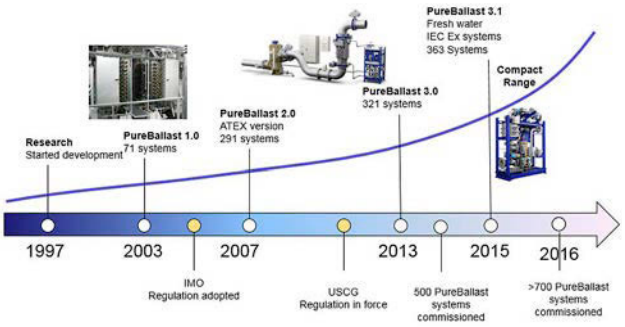
Ballast Water Treatment

Selwyn Oliviera, Energy and Marine Division Manager with Alfa Laval Australia, gave a presentation on *Ballast Water Treatment* to a joint meeting with the IMarEST attended by 22 on 6 September at the Royal Prince Edward Yacht Club, Point Piper.

Introduction

Selwyn began his presentation by saying that it was exactly 100 years ago that the US Navy asked Alfa Laval to develop a centrifugal oil-cleaning separator, which was delivered in 1917. Since then, the company has become a global sales and service organisation with 100 years of experience, and an established partner in the marine industry. The company has been a pioneer in ballast water treatment systems since 2003. They have obtained compliance in all waters, with both IMO and US Coast Guard Type Approval for their PureBallast system. To date, they have 1400 systems sold, with 300 retrofitted installations.

Alfa Laval's Pure Ballast System 1.0 was developed in 2003, and then an explosion-proof version followed in 2007 for tankers. In 2012 the US Coast Guard regulations came into force. PureBallast 3.1 received Coast Guard type approval in December 2016, and the compact range was developed for platform supply vessels and the offshore industry. They can supply high-capacity systems for large vessels requiring 4–6000 L/h, or low-capacity systems for small ships requiring less than 100 L/h and fitting into a small space.



Alfa Laval's experience in ballast water treatment
(Image courtesy Alfa Laval)

Legislation

The International Maritime Organisation of the United Nations recognises the spread of aquatic invasive species as one of the four greatest threats to the world's oceans, and developed the Ballast Water Management Convention. For entry into force, this required agreement by 30 states and 35% of world gross tonnage. To date, agreement by 54 states and 53% of world GT has been achieved, and the IMO Ballast Water Management Convention was ratified on 8 September 2016, twelve years after it was written, and entered into force on 8 September 2017 to prevent the spread of invasive species via transport in ballast tanks onboard vessels. So far, 69 systems have achieved IMO type approval.

In addition, the US Coast Guard regulations entered into force in December 2013, so a ship owner/ship operator intending to deballast within US territorial waters must have a US Coast Guard-compliant BWTS. So far only four systems have achieved USCG type approval in addition to IMO type approval, PureBallast 3.1 being one of them.

Implications

From 8 September 2017 all vessels subject to the convention need to have an approved ballast water management plan on board and maintain a ballast water record book. They will have to manage their ballast water on every voyage by either performing ballast water exchange or by treating it using an approved ballast water treatment system. They will have to undertake an initial survey and be issued with an International Ballast Water Management Certificate. Ships that are registered with flag administrations which are not yet a party to the Convention will need to demonstrate compliance and may have to undergo surveys and be issued with a document of compliance.

Newbuildings constructed after 8 September 2017 must have a ballast water management system (BWMS) installed. Existing vessels need to be equipped with a BWMS at the

next International Oil Pollution Prevention (IOPP) renewal survey from 8 September 2019.

Ballast water exchange is not sufficient for vessels making ballast discharge in US territorial waters, if they do not have a granted extension, i.e. an extended compliance date. At the USCG extended compliance date, the vessel must install a USCG type approved system or install an AMS that can be used five years after the extended compliance date, even if they are not yet required to be compliant with the D-2 standard of the IMO BWM Convention.

IMO Status

IMO's Revised G8 Guidelines (for BWM system test requirements) were finalised and approved at MEPC 70 in October 2016, resulting in more-stringent test guidelines and alignment with USCG test requirements. These guidelines are mandatory and were renamed *Code for Approval of Ballast Water Management Systems*. No new Type Approval Certificate based on the old G8 Guidelines will be issued after 28 October 2018. From 28 October 2020, all BWMS installed on board must be approved under the Revised G8 Guidelines. The approval of the Revised G8 was important to clearly define the requirements for type approval testing at a stringent level.

PureBallast has the advantage of being compliant with the Revised G8 through the USCG testing. It will be one of the first systems to gain a type-approval certificate according to the Revised G8 Guidelines.

USCG Ballast Water Discharge Standard

The US Coast Guard's Standards for Living Organisms in Ships' Ballast Water Discharged in US Waters established a ballast water discharge standard (BWDS) for the allowable concentration of living organisms in ship's ballast water discharged in waters of the United States. Vessels employing a Coast Guard-approved BWMS must meet the following BWDS:

- For organisms greater than or equal to 50 μm in minimum dimension: discharge must include fewer than 10 organisms per kilolitre of ballast water.
- For organisms less than 50 μm and greater than or equal to 10 μm: discharge must include fewer than 10 organisms per millilitre of ballast water.

Indicator micro-organisms must not exceed:

(i) For toxicogenic vibrio cholerae (serotypes O1 and O139): a concentration of less than 1 colony-forming unit (cfu) per 100 mL.

(ii) For escherichia coli: a concentration of fewer than 250 cfu per 100 mL.

(iii) For intestinal enterococci: a concentration of fewer than 100 cfu per 100 mL.

The USCG's ballast water implementation schedule is already in force for all vessels.

An alternate management system (AMS) is a temporary acceptance of a treatment system based on the IMO type approval. A new bulletin released on 6 March 2017 provides new guidance with regard to compliance date extension requests.

If a type-approved system is not available for a vessel, and compliance with the other approved ballast water management methods is not possible, then the vessel owner/operator may apply for an extension of the vessel's compliance date. Whether a type-approved system is "available" will be based on evidence submitted by the vessel owner/operator with the application for extension. The length of compliance-date extensions, when granted, are based on the availability of USCG type-approved systems and detailed installation plans.

After 6 March 2017, owners and operators should not anticipate that they will receive any further extensions to those already granted. They should plan their operations to ensure that the vessel will be in compliance with US BWDS after the expiry date.

The message in the Bulletin is clear: the burden of proof is higher, and extensions will no longer align with scheduled dry docking dates. Hence, extensions in many cases will mean that a BWMS will need to be installed in between dry-dock periods.

USCG and IMO Comparison

The US BWM regulation is not signatory to the IMO BWM Convention.

Vessels discharging ballast water into the waters of the USA must comply with the requirements of 33 CFR 151 Subparts C and D.

Vessels beyond their compliance date are reminded to employ one of the following BWM methods when operating in the waters of the USA:

- Use a Coast Guard-approved ballast water management system.
- Use only water from a US public water system.
- Use an alternate management system (AMS); but note that this is only valid for 5 years from the compliance date.
- Do not discharge ballast water into waters of the USA (including the territorial sea as extended to 12 nautical miles from the baseline).
- Discharge to a facility onshore or to another vessel for purposes of treatment.

Test Methods

There are currently two test methods available for testing ballast water:

- The Most Probable Number Dilution-Culture Method (MPN method) measures the number of viable phytoplankton cells in a sample, via their ability to reproduce. It is a formal mathematical calculation based on binary scoring data from a set of dilutions and replicates from a sample. In a ballast water management application, the binary scoring is of reproduction or no reproduction of phytoplankton, in dilutions and replicates of a ballast water sample.
- The Environmental Technology Verification (ETV) Staining Method (vital stain method) uses a combination of two fluorescein-based stains (FDA and CMFDA) to evaluate the status of organisms in the 10–50 μm size class in ballast water samples. The stains penetrate into organisms, where functional esterases convert them into fluorescent products which are retained by cellular membranes. Using epifluorescent microscopy, fluorescing organisms are enumerated as "living" individuals. Any motile organisms observed are also counted as "living."

The use of an MPN-based method to evaluate mixed

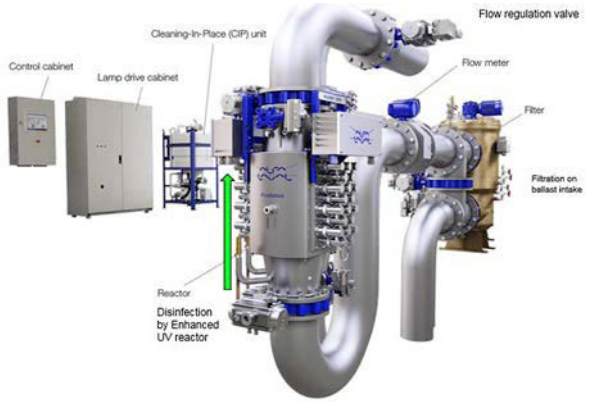
assemblages of organisms in ballast water is going to be validated by Environmental Protection Agency's (EPA) Technical Panel. If the panel finds an MPN method to be acceptable, then the USCG will have to make a policy decision or rulemaking to incorporate the EPA-approved method.

It should be noted that MEPC 70 agreed that viable organisms mean organisms which have the ability to successfully generate new individuals in order to reproduce the species. The MPN method is designed to measure organisms' ability to generate new individuals. The MPN method will be verified in the latter half of 2017 and it is likely that it will be approved by the USCG in 2018.

PureBallast 3.1

The PureBallast 3.1 system handles ultra-violet transmittance (UV-T) down to 42% at full flow! It works in challenging waters, with no limitation on salinity or temperature. It has been tested and approved in all three water qualities: fresh water, brackish water and sea water.

The components of the PureBallast system (apart from the power supply) are shown in the diagram.



PureBallast system components
(Image courtesy Alfa Laval)

The design of the reactor has been optimised through research and real-life experience. Corrosion resistance has been ensured by manufacturing in SMO254, a high-alloy austenitic stainless steel which has been specially developed for sea-water applications and has significantly higher corrosion resistance than 316L stainless steel.

The unit uses medium-pressure lamps for higher intensity, giving 15–20 times the germicidal effect of other lamps. Used in conjunction with synthetic quartz sleeves, giving more light and at a broader wave length, thus increasing the UV dose and attacking the DNA strings at multiple places, resulting in faster disinfection and greater penetration and creating permanent DNA damage.

Equally as important as the reactor for the performance of the system is the filter. Alfa Laval uses a basket filter with 20 µm mesh from Filtrex. Noble materials are used throughout, with the filter housing being in aluminium bronze. Automatic back-flushing is incorporated, and a rotating back-flushing arm ensures that the entire filter area is cleaned with short back-flushing time. The unit is extremely compact, and works at up to 10 bar (1 MPa) pressure. It has been approved for both sea water and fresh water.

Here Selwyn showed an animation of the Filtrex filter.

PureBallast filter
(Image courtesy Alfa Laval)

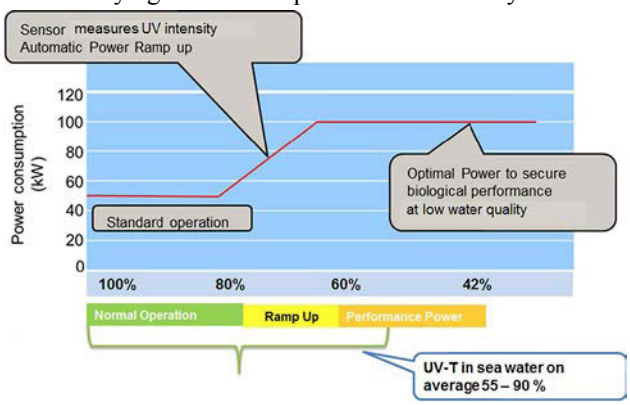
PureBallast cleaning-in-place unit
(Image courtesy Alfa Laval)

The cleaning-in-place (CIP) unit retains the same biological performance over time. It ensures fully-automatic cleaning of the reactor from scaling, removes lime deposits and metal ions, does not scratch the quartz glass sleeves, and outputs a bio-degradable liquid which can be re-used.

Over time there will be build up that cannot be removed by the solution typically used by other UV manufacturers, a wiper going back and forth which scratches the glass, further blocking the UV light and reducing the biological performance. Using the CIP unit, the same biological performance is maintained over time and, since it is gentle, the life time of the quartz sleeve is long.

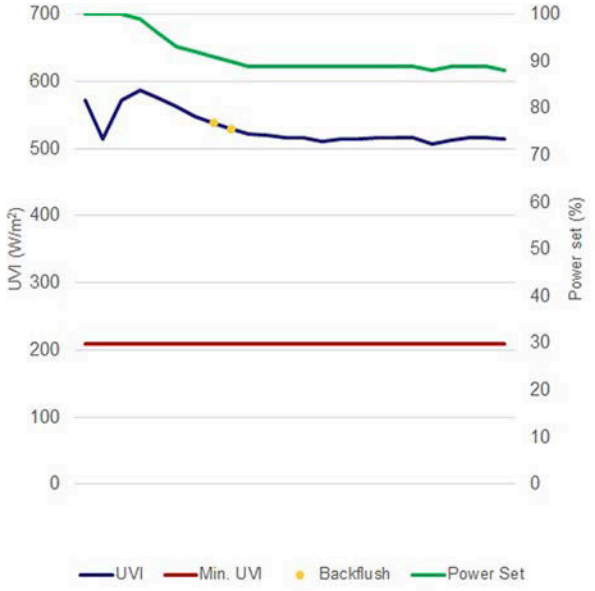
Power Optimisation

Here Selwyn gave an example of a 1000 m³/h system.



PureBallast power optimisation
(Image courtesy Alfa Laval)

Alfa Laval has collected log files from vessels with the system installed, to analyse the performance from actual use. Nantong on the Yangtze River in China is often brought up as an example by ship owners as a challenging port but, thanks to the efficiency of PureBallast, the power consumption is less than 100%. The yellow dots in the graph show the backflush, and the conclusion is that the filter can handle the "dirt load" without any problem, and frequent backflush



Power consumption for PureBallast 3.1
600 m³/h system in the Port of Nantong, China
(Image courtesy Alfa Laval)

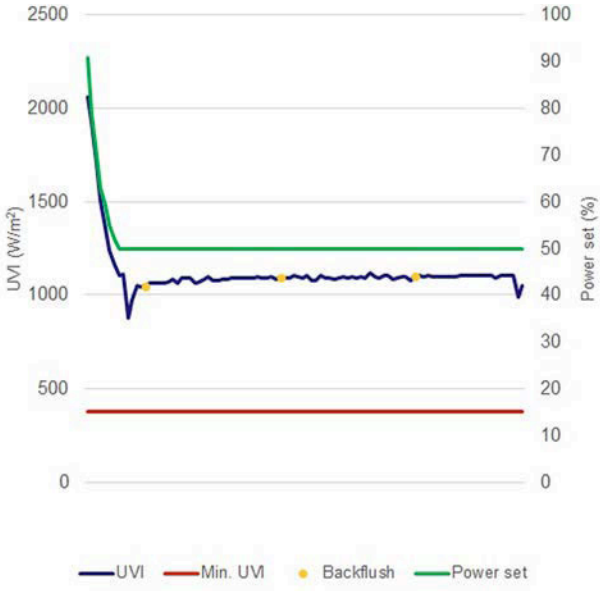
In the port of Yangshan, China, outside Shanghai, the conditions are very different. Here the performance of PureBallast becomes even more clear, the system goes down to 50% of installed power and the filter performs well, with few backflush operations.

Product Portfolio

Alfa Laval has solution sizes available to fit any vessel, operating on 400–440 V AC at 50/60 Hz.

In addition, Alfa Laval has developed an explosion-proof version, PureBallast 3.1 EX.

Two international certification schemes currently exist for hazardous areas. One scheme is endorsed in Europe under the ATEX Directives, while the other scheme is the International Electrotechnical Commission's IEC-Ex



Power consumption for PureBallast 3.
750 m³/h system in the Port of Yangshan, China
(Image courtesy Alfa Laval)

	PureBallast 170 m³/h	PureBallast 300 m³/h	PureBallast 600 m³/h	PureBallast 1000 m³/h
Lamps	6 x 3 kW	10 x 3 kW	20 x 3 kW	16 x 6 kW
Min power	11 kW	18 kW	33 kW	53 kW
Max power	20 kW	33 kW	63 kW	100 kW

PureBallast sizes available
(Image courtesy Alfa Laval)

system which provides a more international but voluntary equipment certification scheme accompanied by the conformity mark licence scheme and other certification schemes for service facilities and persons.

In the PureBallast 3.1 EX system, the control cabinet can be located in the engine room, and the reactor in the pump room.

PureBallast 3.1 EX explosion-proof vesion
(Image courtesy Alfa Laval)

To cater for platform supply vessels and the offshore industry, they have developed a compact range of skid-mounted solutions which have the smallest footprints in the market: 1.4 m² for 170 m³/h, or 2.2 m² for 300 m³/h. They have market-leading disinfection performance, the best functionality in fresh, brackish and sea water at 42% UV-T, and reduced power consumption through UV dosage control. The compact units are available in 85, 135, 170, 250 and 300 m³/h sizes.

Life-cycle Analysis

Alfa Laval has done a cost comparison of their product with two other UV systems, one using medium-pressure lamps, like PureBallast, and another using low-pressure

PureBallast 3.1 compact unit
(Image courtesy Alfa Laval)

Product	Max flow	Min flow	Note
PB-300S	300 m^3/h	75 m^3/h	Skid
PB-250S	250 m^3/h	65 m^3/h	Skid
PB-170S	170 m^3/h	50 m^3/h	Skid
PB-135S	135 m^3/h	42 m^3/h	Skid
PB-85S	87 m^3/h	32 m^3/h	Skid

PureBallast 3.1 compact sizes available
(Image courtesy Alfa Laval)

lamps. From a life-cycle cost perspective, for a 1000 m^3/h system, with a life of 20 years and 600 hours of ballast water operations per year, specific fuel consumption of 235 g/kWh and fuel oil at €350/t:

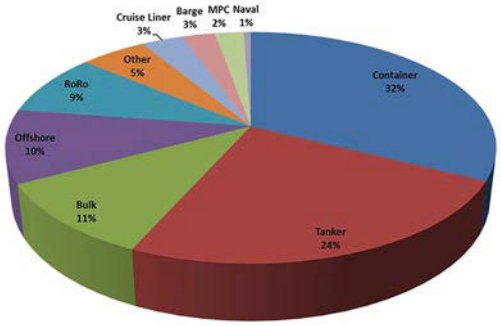
Manufacturer	Alfa Laval	System A	System B
Avg kWh	51	100	60
Fuel	€ 50 337	€ 98 700	€ 59 220
# Lamps	16	18	240
Lamp Life	3 000	2 500	12 000
Lamp Replace	€ 28 800	€ 38 880	€ 108 000
Lamp Type	MP	MP	LP
Quartz Sleeve Life	15	10	10
Sleeve Replace	€ 4 256	€ 9 576	€ 127 680
Reactor Material	SMO	316L/SMO	316L
# for 1000 cu/hr	1	1	4
Reactor Life	20	15	10
Reactor Cost	€ 0	€ 172 500	€ 1 020 000
Filter Material	AlBrz	Epx Ctd Steel	Steel
Filter Life	20	12	10
Filter Cost	€ 0	€ 46 656	€ 93 312
Filter Insert	Basket	Duplex Screen	Candles
Insert Life	5	5	5
Insert Cost	€ 107 100	€ 155 520	€ 155 520
Totals	€ 186 237	€ 512 256	€ 1 436 052

PureBallast 3.1 cost comparison for 1000 m3/h system
(Table courtesy Alfa Laval)

The single biggest impact is the material for the UV reactor, where SMO has an expected lifetime of four times that of 316L stainless steel. The second-biggest impact is from the lamps. Despite low-pressure lamps having up to four times longer expected lifetime, the large number of lamps needed, up to 15 times more than PureBallast, the cost becomes three-to-four times higher!!! Another important cost is the quartz sleeves which, thanks to the CIP unit, both maintain biological performance (keeping power consumption down), and minimise need for changing this part. For other systems, this becomes a considerable cost and, again, even more for low-pressure lamps due to the high number. The conclusion is that, over the life cycle of a system, there are important differences in operating expenditure and why investing in an efficient system, with high-quality components, quickly pays off.

Fitting PureBallast Systems

Alfa Laval has sold more than 1400 systems, with more than 1000 systems delivered, more than 700 systems commissioned and, of these, more than 300 are retrofits. PureBallast systems have been fitted to many different types of vessels owned by the majors: Maersk, CMA CGM, Mitsui OSK Lines, Bernard Schulte, NYK, Hamburg Sud, and Carnival, among others.



Vessel types fitted with PureBallast systems
(Image courtesy Alfa Laval)

Their philosophy is that no customer is the same, no ship is the same, and no project is the same, and they tailor each project to the customer, ship and project. Good project management minimises the technical complications.

Investment of time in the beginning to set up the project to:

- establish project organisation including representatives from involved parties;
- agree on responsibilities between the parties;
- involve the customer, engineering company and installation company in the specific system;
- plan the project and minimise changes in scope of supply and delivery time;
- make sure everyone has needed knowledge; and
- ensure enough time to execute the project.

The involvement of the supplier ensures:

- clear technical documentation;
- verification of engineering; and
- installation support for successful installation.

Alfa Laval has a service focus, and can provide technical support, including service agreements, re-commissioning packages, performance audits, customer competence and training, parts availability and connectivity. They can offer more than just a product, and some of the customer benefits

include financial predictability, reduction and control of operational costs, optimised maintenance planning, efficient maintenance, extension of time between overhauls, increased vessel availability, Alfa Laval's presence and support, operator and maintenance training.

Conclusion

The IMO and USCG requirements for ballast water treatment are now in force, and ballast water treatment is mandatory for all newbuilds and will be for existing vessels—ballast water exchange is only an interim solution for some existing vessels. Alfa Laval has developed the PureBallast system which treats ballast water with UV radiation, and the system has been type approved as meeting both IMO and USCG regulations.

Questions

Questions time was lengthy and provided some further interesting points.

The Royal Australian Navy's LHDs, HMA Ships *Canberra* and *Adelaide*, are both fitted with PureBallast systems and, since commissioning, have had minor upgrades on the electrical system. Navies are not subject to MARPOL requirements, but the RAN has committed to compliance with the USCG requirements.

Ballast water exchange will not be permitted in the future. It can pose a stability problem for large vessels to exchange ballast water in mid-ocean, but is usually not a problem for small vessels.

The *Spirit of Tasmania* vessels use fresh-water ballast, not sea water.

In Australia, the control of ballast-water management is within the purview of the Department of Agriculture and Water Resources, not the Australian Maritime Safety Authority. Basically, Australia is playing catch-up to the IMO and USCG requirements, but hasn't yet signed the IMO BWM convention. The US Navy requires all of its vessels to have ballast-water treatment systems meeting the USCG requirements.

The USCG requirements are more stringent than the IMO requirements, so the PureBallast system now incorporates a change-over switch so that the engineer can change from IMO operation (for Europe) to USCG operation (for the USA) very easily.

It is possible to match a data logger on the PureBallast system to the ship's log to prove that the ballast-water treatment system has been run.

The vote of thanks was proposed, and the certificate and "thank you" bottle of wine presented, by Greg Hellessey.

Phil Helmore

Tasmania

Submarine Manoeuvring and Control

Paul Crossland, Team Leader, Naval Architecture and Marine Engineering—Submarine Propulsion, QinetiQ, UK, gave a presentation on *Assuring Submarine Manoeuvring and Control Safety* to a meeting at the Australian Maritime College on 28 September.

The submarines of today are generally described as one of the most-complex systems-engineering design problems, particularly in the context of the changes in submarine operations since the end of the Cold War; changes which involve concepts and doctrine now targeted towards supporting national interests in regional crises and conflicts around the world. The modern submarine is an important component in joint operations and is capable of conducting covert operations in areas far from the port of origin.

One aspect of submarines which has not changed is that safety is imperative; service in submarines has always been regarded as potentially hazardous, but exacting standards in training and submarine design/maintenance have reduced the occurrence of operator-error-induced accidents and catastrophic component failures. The requirement to manage the safety of a submarine platform whilst at sea necessitates a number of key factors being understood; one of those factors is the ability to understand the manoeuvring and control behaviour of the submarine throughout the design process. This capability should be able to safely explore the safe operating boundaries of the submarine during the early design phases, to ensure that unsuitable designs are not taken through to build, and to ultimately provide safety guidance for at-sea operations. Moreover, to ensure safe operation requires an ensemble of capabilities which includes theoretical tools, physical model tests and full-scale trials.

Paul's presentation described QinetiQ's approach to providing the evidence for assuring submarine safety which has been developed over many years of testing to provide support to the UK Ministry of Defence in developing design guidance and evaluation toolsets for the benefit across the design process. Paul was able to detail a number of methodologies, including numerical analysis ranging from parametric right through to full CFD models, experimental modelling from controlled-motion model-scale through to full-scale validation studies.

The presentation was well received, with a great audience of industry, government, academic and student attendees, and question time ran well past the allotted schedule.

Jonathan Binns

Jonathan Binns (L) with Paul Crossland (R) beginning his presentation to RINA at the AMC (Photo courtesy Lauchlan Clarke)

CLASSIFICATION SOCIETY NEWS

LR Redefines Rules for High-speed Aluminium Catamarans

Lloyd's Register (LR) has updated its Special Service Craft (SSC) Rules and Regulations with a specific focus on aluminium catamaran designs and other high-speed craft. The new rules allow for greater design freedom and increased flexibility, improving LR's approach to these mass-critical designs.

By reducing prescriptive arrangements, the new rules are tailored for these specialist vessel types, offering flexibility in requirements tailored to operating areas and a greater scope for special consideration of design arrangements. LR will work with its clients to co-create bespoke design solutions.

This rule update was driven by the industry need to safely and rapidly exploit the benefits offered by developing technologies. LR conducted a series of mass studies which have validated improved structural efficiency for these vessel types. The new rules will support innovation in the sector by establishing requirements for which compliance can be demonstrated through the application of risk-based assessment techniques.

Joanna Mycroft, LR Senior Specialist, commented "Having just completed the structural approval of some new vessels using LR's new SSC rules, I have been able to see how well they fit this format and the benefits which they bring to designers. The rules create a flexible approach to the design which provides a solution to fit a wide range of different requirements. "The new rules provide lighter, faster vessels, with much more scope for adapting the rules to each design individually. This really puts us ahead in a place where the rules will be applicable for many years to come."

For multihull vessels, a number of arrangement criteria have been updated and prescriptive requirements have been removed. Examples of these include requirements for bridging structure bulkheads and members typically used for dry dockings, including centreline girders.

Minimum thickness requirements have also been updated based on service experience. In areas which are well protected from occasional loads, it is acknowledged that these requirements may be less relevant. These changes allow designers to exercise an engineering approach to improving structural efficiency.

The minimum design pressure for glazing has been reviewed in terms of the minimum load formulation to be applied. This reduction in design pressure requirements is expected to provide significant mass savings.

This will not only have a positive impact on the design of future LR classed vessels, but also on Australian DCVs where the structural part of the LR SSC rules is used as the deemed-to-satisfy solution for Part C3 of the National Standard for Commercial Vessels.

LR Australia's Technical Support Office will present these rules changes to AMSA and to the main Australian designers in the coming weeks.

Pierre Chateau

Prelude Enters Lloyd's Register Class

Shell's floating liquefied natural gas (FLNG) facility *Prelude* has officially entered into Lloyd's Register (LR) class. At 488 m long, 74 m wide and displacing about 600 000 t, *Prelude* is the largest floating offshore facility in the world.

Last month *Prelude* arrived at its operating location in the Browse Basin, 475 km north-north-east of Broom, WA. It will be moored at a depth of 250 m and will not be dry-docked for the first 25 years of its expected 50 year operational life. The facility required around 260 000 t of steel to build and its turret is the largest ever built. It has been designed to withstand Category 5 cyclones and its technology has generated over 150 patents.

LR has been actively involved with the project from the start, helping to ensure that it will operate safely by applying FLNG expertise through classification, equipment certification, validation and verification against performance standards.

Shell's FLNG facility *Prelude*
(Image from Shell Australia website)

Prelude's substructure and turret have been designed and constructed in accordance with LR's Rules for Floating Offshore Installations at a Fixed Location and its topsides certified to an agreed set of industry codes and standards. LR also confirmed compliance of the facility with Shell's design and engineering practices, where applicable, and the performance standards specified by *Prelude*'s safety case.

Daryl Attwood, LR's *Prelude* Project Director, commented "It has been a great honour for us all to participate in this world-class project, collaborating with an excellent group of clients represented by the best managers and technical experts from Shell, Technip, SBM, and SHI. LR project managers, design-appraisal specialists and surveyors from Aberdeen, London, Dubai, Perth and Korea have contributed significantly to getting the facility to this stage, ably supported by colleagues certifying equipment packages literally around the world."

The intended risk-based classification scheme is expected to benefit from the use of the latest in remote-inspection technologies to gather accurate and repeatable survey data to allow a predictive and focused approach. The LR team in Perth will be welcoming colleagues from LR's Geoje office in the coming months to assist in the transition from the yard through offshore commissioning to the operations phase.

Jeff Baker, LR's Offshore Business Development Manager for Australasia, said "The LR Perth team is privileged to support this exciting, huge and complex project going ahead and to continue the strong business relationship between Shell and LR globally. By using the latest in ROV and

AUV deployed equipment, we see big opportunities for improvement in the safety, accuracy and manner of offshore facility inspection in service and we anticipate that this will flow on to a new way of approaching classification."

LR Press Release, 23 August 2017

Global Marine Technology Trends 2030 Autonomous Systems

Lloyd's Register, QinetiQ and the University of Southampton have launched a report giving new insights into future developments and challenges in marine autonomy. The report considers employment, skills and socio-economic impacts of autonomous systems, and says that the ability of regulatory and legal systems to adapt will be a challenge. Consumer-driven technology developments will drive the pace of change, and changing skillsets will be required for seafarers.

Maritime activity over the next decade will be dominated by unmanned surface and underwater vessels, according to the report on the future of autonomous maritime systems. Written and researched by Lloyd's Register, QinetiQ and the University of Southampton, the report is a follow-up to Global Marine Technology Trends 2030, looking at how technology trends will impact upon the regulatory and social aspects of maritime operations.

Tim Kent, Technical Director, Marine and Offshore, Lloyd's Register, said "Networks of autonomous surface and underwater vessels are set to radically change the nature of maritime operations. Developments widely reported in the media, such as those in autonomous shipping, are happening with greater pace than expected as little as two years ago. These developments enabled by technology provide new opportunities and potential for disruptive business models. However, the principal challenges will be the integration of these autonomous systems into current maritime operations, legal and regulatory requirements, and not least the impact upon seafarers."

Bill Biggs, Senior Campaign Leader for Autonomy, QinetiQ, said "Technological advances in consumer and adjacent markets are a real opportunity for the maritime sector. Applied artificial intelligence, low-cost low-size sensors, increased connectivity, improved cyber security and better energy management are all likely to drive rapid and disruptive change. Trials already undertaken by navies and transport companies demonstrate the opportunities that autonomous maritime systems present. In 2016 QinetiQ supported *Unmanned Warrior*, the largest demonstration of its type ever conducted, running as part of a major multinational naval exercise. It's just one example of the steps the UK is taking to keep up with the accelerating pace of change."

Professor Ajit Shenoi, Director of the Southampton Marine and Maritime Institute at the University of Southampton, said "The report recognises that autonomous systems and associated technologies will require people to learn to work seamlessly with them. Crew members of the future may become shore based, managing vessels remotely from the office or the sea, creating the need for new training and skillsets. The potential for the command and control to be geographically displaced from the vessel will also require behavioural and cultural changes within the maritime community."

David Dingle CBE, Chairman of Maritime UK, said "I'm delighted that this timely and thought-provoking report is being launched during London International Shipping Week, demonstrating the UK's preeminent role in cutting-edge innovation and thought leadership for our global industry. This thought leadership from three world-leading companies and educational institutions, coupled with exciting developments from leading manufacturers such as Rolls-Royce, ASV and a wealth of small- and medium-size players, mean that the UK, the world's maritime centre, really is leading the autonomy revolution."

To download a copy of *Global Marine Technology Trends 2030 Autonomous Systems* please visit www.lr.org/GMTT2030.

LR Press Release, 12 September 2017

Bureau Veritas joins Global Industry Alliance

At a ceremony in Singapore on 25 September, Bureau Veritas formally joined the Global Industry Alliance (GIA).

Philippe Donche-Gay, President Marine & Offshore, Bureau Veritas said that he was delighted that BV was able to provide support to the GIA: "Whether it's a better understanding of hull structures, digitalisation, gas-fueled and hybrid systems or the many other areas of research and development which are leading to practical solutions, our Marine & Offshore Division — and the 70 000 Bureau Veritas people around the world (10 000 in China alone) across our group — will be able to contribute towards this important initiative."

The GIA was officially inaugurated on 29 June by IMO Secretary General, Kitack Lim. Seventeen companies have now signed up to join the GIA, which will work within a framework established by Global Maritime Energy Efficiency Partnership (GloMEEP) Project, a Global Environment Facility (GEF) – United Nations Development Program (UNDP) – IMO project.

The GIA will support improving the energy efficiency of ships and shipping by collectively identifying and developing innovative solutions to address common barriers and promote the uptake of energy efficiency technologies and operational measures.

The GIA is focused on five priority areas of collaboration:

1. Energy Efficiency Technologies (EETs) and Operational Best Practices;
2. Alternative Fuels and Energy Carriers;
3. Digital Transformation;
4. Finance; and
5. The Human Element

Activities likely to be undertaken or promoted by the GIA on these priorities will include, inter alia:

- research and development;
- showcasing advances in technology development and positive initiatives by the maritime sector;
- industry fora to encourage a global industry dialogue;
- implementation of capacity building; and
- information exchange activities.

A GIA Task Force comprising representatives of the members has been formed to act as the advisory body to the GIA and to take decisions on which activities to undertake under the GIA umbrella.

Selected GIA projects will be implemented by the GloMEEP Project Coordination Unit, with the advice of the GIA Task Force. Activities will be funded by a Fund (GIA Fund) established by IMO.

The GloMEEP Project aims to provide long-term global environmental benefits by supporting the effective implementation of IMO's energy efficiency regulations (Chapter 4 of MARPOL Annex VI), particularly in the developing countries.

Three main streams of work have been set up so far:

- Legal, policy and institutional reforms.
- Awareness raising, knowledge sharing and capacity-building activities.
- Public-private partnership to support low carbon shipping.

BV Press Release, 25 September 2017

Bureau Veritas joins the RECOMMS Drones Project

Bureau Veritas has joined RECOMMS (Remote Evaluation of Coatings/Corrosion on Offshore Machinery and Marine Structures/Ships), a joint investment project (JIP) to develop drones with the capability to inspect steel structures in enclosed spaces. The JIP's primary objectives are to develop a steady, stable and reliable drone capable of following programmable flight paths, either pre-determined by 3D imagery software or flown by a pilot, using 3D simulator ship-specific training programmes developed in unison with the drone design. This will lead to the development of a complete and marketable inspection drone when delivered with the required software package.

Key investment partners for the confined space ambitions include Akzo Nobel, Barrier Group, Bureau Veritas, Drone Ops, Hempel Paints, Marine Technical Limits and a major oil company. Safinah Ltd, coating specialists and consultants, are the RECOMM project managers.

In the first phase of development the drone will be designed to carry an unobstructed HD camera as well as lighting and batteries with suitable strength, durability and longevity to perform structural and coating inspections within a ballast tank whilst providing reliable clear images fit for comparison with close up inspection.

Jean-François Segretain, Technical Director, Bureau Veritas, Marine & Offshore, said "The end goal is to be able to survey cargo spaces, ballast tanks and confined spaces remotely and effectively. If we can do this with drones we can help reduce risks to our surveyors and ship crews by minimising the need, for example, to erect expensive staging whilst covering the survey scope which would otherwise require surveyors to work at height or perform tank inspections by means of rafting."

It is estimated that eliminating the need for staging erected for class-renewal surveys could save in the region of $US 90 000 for a VLCC or $US40 500 for a capesize bulk carrier (based on dry-docking costs in China for ships of ten years and older).

Jean-François Segretain said "While a lot of work has been done with drones, nothing yet released has led to drones meeting specific requirements for marine classification close-up surveys. This project addresses the specific needs of our survey requirements and other inspections."

As a secondary goal, the project will also address the

potential for inspection of open-space marine structures such as offshore wind-turbine blades. Once tank inspection objectives have been met, the drone will be designed with a payload carrying capacity capable of further developing the attachment of sensing equipment with the end goal of performing paint and coating application analysis as well as steel-thickness measurement. Paint coating and plate thickness gauging equipment manufacturers are already involved with others being encouraged to join the project, in order to develop specialized sensing equipment suitable for the drone.

BV Press Release, 3 October 2017

RECOMMS drone pilot training — navigating a wing ballast-tank hopper compartment
(Image courtesy Marine Technical Limits)

Reducing the Risk of Propulsion Loss — New Guidance from BV

In a joint project, leading international classification society Bureau Veritas and TMC Marine, a Bureau Veritas Group Company since 2016, have cooperated again with the London P&I Club to produce the second booklet in a series on loss-prevention issues.

This new publication focuses on the marine engineering issues and procedures related to loss-of-propulsion incidents and how to prevent them.

Blackouts, propulsion limitations, total loss of propulsion and loss of steerage capability are all serious incidents when they occur during navigation in non-congested waters. However, when incidents such as these occur during manoeuvring in restricted areas such as traffic lanes, when entering or leaving port, or when a vessel is navigating close to a coast during heavy weather, the risk to the vessel and personnel is critical and may result in a major casualty.

The purpose of the new booklet is to provide general guidance and practical advice to marine engineers and ship owners on blackout and main engine failures, the risks associated with propulsion loss and the precautions which can be taken to prevent these risks. It is not intended to replace IMO regulations and guidance notes or documentation forming part of a vessel's safety management system; the guidance is a practical tool for all involved in shipping.

Jean-François Segrétain, Technical Director, Bureau Veritas Marine & Offshore, said "The industry is aware of the continued incidence of blackouts and propulsion loss. We consider it important that the industry has an easy-to-use, concise guide to the risks involved and, importantly, guidance on the risk-management tools that can reduce the risk of propulsion loss. The expertise of class, P&I and TMC is a strong combination. We will continue to provide guidance to help reduce risk in marine operations."

Carl Durow, Loss Prevention Manager, London P&I Club ,said that proper root-cause analysis of loss-of-propulsion incidents, regardless of severity is key to risk mitigation. "The Club has seen an increase in the number of machinery failure related cases in recent years. This publication is aimed at raising awareness of the necessary good practices and post-incident investigation activities which, in combination, can result in a much reduced risk of significant claims. In the majority of cases it is the timing and location of the incident which dictates the severity of the claim."

The first booklet in the 'Reducing the Risk' series – *Reducing the Risk of Liquefaction*, was published in March 2017.

BV Press Release, 11 September 2017

FROM THE CROWS NEST

Pacific 2017 IMC

The Pacific 2017 International Maritime Conference was held at the brand-new International Conference Centre Sydney at Darling Harbour on Tuesday 3 to Thursday 5 October, in association with the Pacific 2017 International Maritime Exposition.

A total of seventy-two papers in three and two parallel streams and a panel discussion on *Off-the-shelf Naval Design through Requirements Engineering* were presented. The conference program can be seen on the Pacific 2017 IMC website.

A feature of the new centre is the nautical-mile distance between the Conference Halls and the Exhibition Hall which includes the dining and morning-tea areas. This meant that delegates received their daily exercise with long treks between conferences and morning tea and lunch!

It was good to see delegates to the IMC from all Australian states and international, as well as naval architecture students from UNSW Sydney, Patrick Doherty, Edward Hawkins, Patrick McManus and Gianluca Viluce on RINA-sponsored student places.

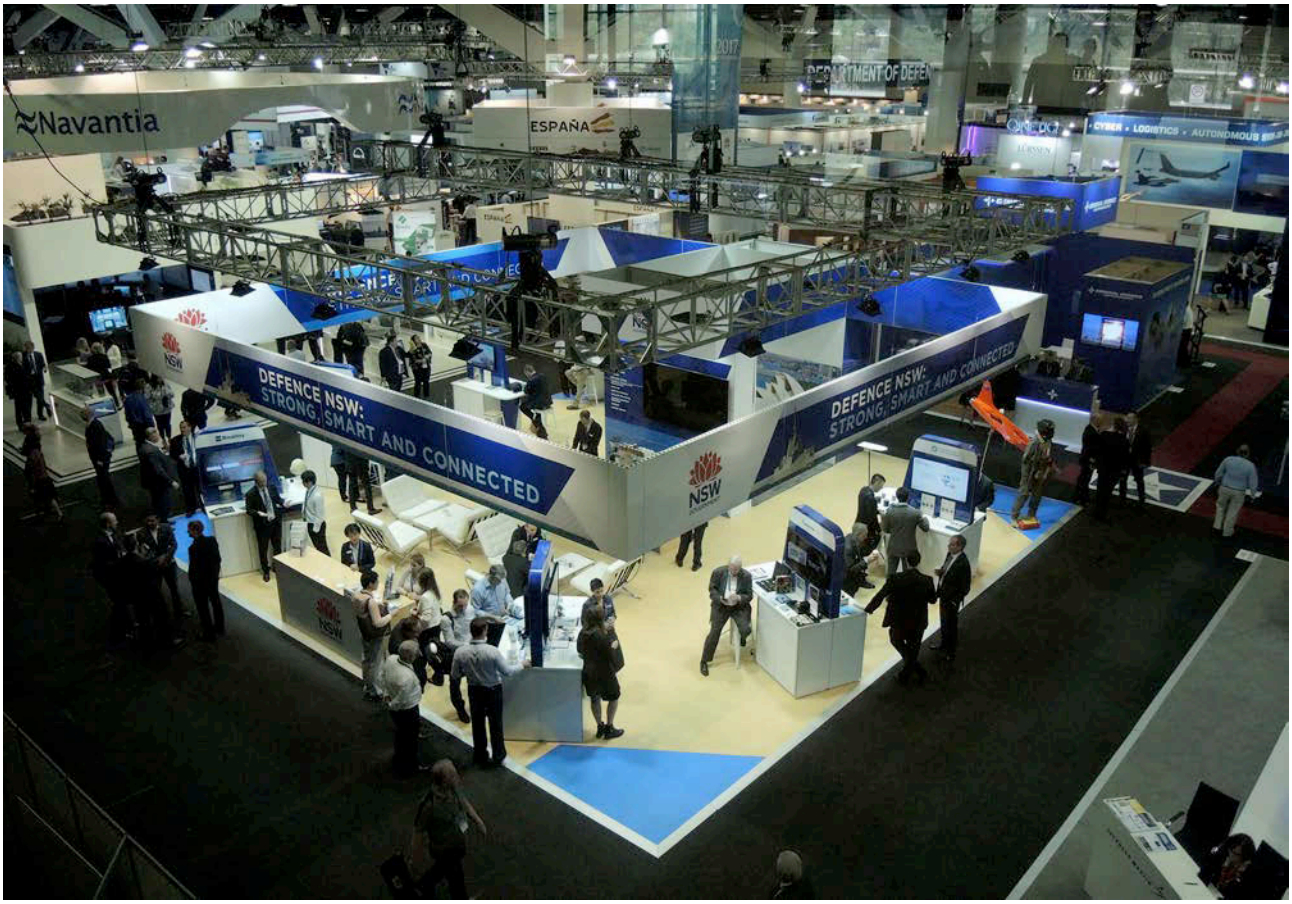
The Cocktail Reception for the International Maritime Conference was held in the Terrace Room at the Australian National Maritime Museum, on the evening of Wednesday 4 October. Speeches were limited to the welcome by the Chair of the Pacific 2017 IMC Organising Committee, John Jeremy, and a short address by Captain Nick Woods of Teekay Shipping, the sponsor for the Cocktail Reception. Champagne, white and red wine, beer and finger foods were served throughout the evening for the delectation of the guests, and many tall tales and true were told.

The Australian Maritime College's research vessel, *Bluefin*, made the voyage to Sydney and berthed at the Australian National Maritime Museum to show the AMC flag. A bonus was that she provided on-site accommodation for the entire AMC contingent at the IMC!

The AMC's *Bluefin* berthed at the Australian National Maritime Museum between HMAS *Vampire* and the steam yacht *Ena* which was recently donated to the Museum
(Photo John Jeremy)

RINA Stand at Pacific 2017 Exhibition

RINA had a stand at the Pacific 2017 Exhibition held at the Sydney Exhibition Centre on Tuesday 3 to Thursday 5 October.



The exhibition floor at the Pacific 2017 International Maritime Exposition at ICC Sydney in October
(Photo John Jeremy)

The stand was crewed almost continuously throughout the Exhibition by the Chief Executive, Trevor Blakeley, together with Australian members of RINA attending the International Maritime Conference and who volunteered their time. Thanks to Jonathan Binns, Adrian Broadbent, Jonathan Emonson, Geoffrey Fawcett, Rob Gehling, Phil Helmore, Claire Johnson, John Lord, Aminur Rashid and Martin Renilson.

Phil Helmore

The RINA stand at Pacific 2017
(Photo John Jeremy)

David Kershaw, Chief of Maritime Division, DST Group presenting his keynote address on 4 October
(Photo John Jeremy)

Martin Edwards, GM Submarine Capability Development, ASC speaking at the Pacific 2017 IMC
(Photo John Jeremy)

Captain Nick Woods speaking at the Cocktail Party at the ANMM on behalf of the sponsor, Teekay Shipping
(Photo Rob Gehling)

3D Printed Yacht

The world of high-speed boat racing could soon be shaken up by 3D printing, as an Italian start-up has come one step closer to building a new yacht using the technology. Livrea has been developing a fully 3D printed racing yacht in collaboration with 3D printing expert Autodesk. The two companies have just completed their largest component yet, which was on display in May at the RAPID + TCT event for 3D manufacturing in Pittsburgh, PA, USA.

Livrea co-founders Daniele Cevola and Francesco Belivsi are part of the grand old tradition of Sicilian boatbuilding, and had been making yachts for many years before they decided to take advantage of 3D printing technology. Initially using it for small-scale models as well as to produce some parts of their more sedentary boats like the 26 ft (7.92 m) day-sailer Livrea 26, they soon saw its potential to give their racing creations a competitive edge.

Recognizing that 3D printing technology would drastically speed up production time and bring down costs while advancing their designs to the next level, they embarked on a collaborative project with Autodesk to completely revolutionize their manufacturing process.

One of Autodesk's most recent manufacturing innovations is a large-scale automated 3D printing process. It uses advanced motion-control and machine-learning techniques to synchronize robotic and extruded manufacturing, making in-process real-time monitoring of a print job and 'free-form' material layup strategies possible for the first time.

Livrea's yacht project is one of the first industrial examples of this new technology being put to use, and it is pointing the way forward for many manufacturing sectors besides boatbuilding.

According to Massimiliano Moruzzi, Senior Principal Research Scientist at Autodesk, "Livrea is a great example of a company exploring the future of making things and shaking up its industry. The team are harnessing the very latest in advanced manufacturing techniques and materials and showing what is possible in the here and now. We're really excited to help Livrea on its quest to the world's first 3D printed yacht, and I know many much bigger companies are watching with interest how many of the processes we're developing here can be applied in other industries too."

3D printing has provided an unprecedented level of complexity in terms of hull curvature and other dynamic design features. Initial hand-drawn designs have been worked up into elaborate 3D models using Autodesk's Fusion 360 modelling software, and a range of advanced multi-material polymer composites can now be used instead of wood to achieve the best possible structural accuracy and lightness.

Compared to traditional manufacturing methods, which can take months, 3D printing represents a massive upgrade in terms of speed, with parts able to be 3D printed in a matter of hours. This allows for much more extensive testing of designs, and allows the boatbuilders to save money and cut down on waste materials.

While we have seen 3D printing technology used for these kind of racing yachts before, this is the first time a company has set out to build a boat from scratch, and we're excited to see how this project will progress. We may have to wait a little while yet, however, as Livrea plans to have the yacht finished in time for it to race in the 2019 Mini Transat.

This solo transatlantic yacht race typically starts in France and ends in Brazil, covering over 4000 n miles with a stop in Madeira or the Canary Islands, and is one of the most exhilarating and challenging events in the global yachting calendar. Regardless of what happens, it is likely to be the site of another key stage in the evolution of 3D printing technology.

www.3ders.org/articles/20170510-livrea-and-autodesk-collaborate-on-fully-3d-printed-racing-yacht.html
10 May 2017

Prototype hull section of 3D printed yacht
(Photo from www.3ders.org website)

3D Printed Propeller

A prototype of the world's first class-approved ship's propeller manufactured using 3D printing techniques has been produced by a cooperative consortium of companies which includes Damen Shipyards Group, Rotterdam Additive Manufacturing LAB (RAMLAB), Promarin, Autodesk and Bureau Veritas.

The 1350 mm diameter propeller, named WAAMpeller, was fabricated from a nickel-aluminium bronze alloy at RAMLAB in the Port of Rotterdam. The propeller was produced with the Wire Arc Additive Manufacturing (WAAM) method using a Valk welding system and Autodesk software. The three-blade structure uses a Promarin design which is used on Damen's Stan Tug 1606. With production complete, the WAAMpeller will be CNC milled at Autodesk's Advanced Manufacturing Facility in Birmingham, U.K.

The 400 kg prototype 3D printed propeller represented a steep learning curve of the understanding of material properties, according to Kees Custers, Project Engineer in Damen's R&D department. "This is because 3D printed materials are built up layer by layer," Custers explained. "As a consequence, they display different physical properties in different directions, a characteristic known as anisotropy. Steel or other cast materials, on the other hand, are isotropic, i.e. they have the same properties in all directions."

Because of this critical difference, one of the first steps was to carry out extensive testing of the material properties of the printed material to ensure compliance with Bureau Veritas standards. "This involved printing two straightforward

walls of material, then using a milling machine to produce samples for lab testing of tensile and static strength," Custers said. "The challenge has been to translate a 3D CAD file on a computer into a physical product. This was made more complex because this propeller is a double-curved, geometric shape with some tricky overhanging sections," Custers explained.

Yannick Eberhard from Promarin's R&D department, added, "The transformation from semiautomatic to robotic processing is the solid foundation for even more complex and reliable future propeller designs."

"Material characterisation and mechanical testing have been an important part of this project," said Wei Ya, Postdoctoral Researcher from the University of Twente at RAMLAB. "We have to make sure that the material properties meet the needs of the application. Material toughness, for example, ensuring that the propeller is able to absorb significant impact without damage. But we have also been working towards optimising the production strategy for 3D metal deposition. This includes bead shape and width, as well as how fast we can deposit the printed material."

Highlighting RAMLAB's capacity to print objects with maximum dimensions of 7×2×2 metres, Ya said "For large scale 3D metal deposition, the WAAMpeller is really ground-breaking for the maritime industry. This technology is a fundamental change in the concept of how we make things. With additive manufacturing, you can print most metallic components that are needed in principle. There is so much potential for the future — these techniques will have a big impact on the supply chain."

This first prototype WAAMpeller will be used for display purposes, and planning for a second example is underway. "We start production of a second propeller with class approval later next month, using all the lessons we have learned over the past few months," Custers noted. "We are aiming to install this second one onto one of our tugs later this year."

MarineLink.com, 11 September 2017

Prototype 3D propeller under construction
(Photo courtesy Damen)

BlueTEC Texel Tidal Energy

Bluewater has partnered with a group of leading offshore companies to realise a unique floating tidal energy platform. The platform was installed and commissioned in the summer of 2015. In early 2016, the platform was commissioned with a larger T2 tidal turbine. The platform generated clean electricity from the tides in the Wadden Sea of The Netherlands.

This first BlueTEC serves as a demonstration platform targeted at remote locations worldwide. It is a first start of further development of higher-capacity tidal-energy platforms, to be deployed in large farms. The platform was installed off the island of Texel and was connected to the Dutch electricity grid. It is meant to produce electricity from tidal currents and to test multiple turbine types and configurations.

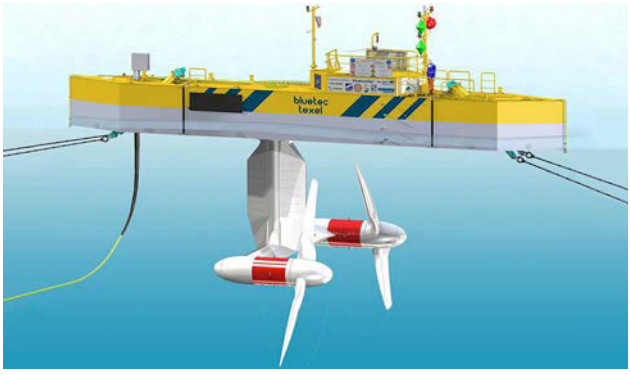
The unique cooperation between Bluewater, Damen Shipyards, Van Oord/Acta Marine, Tocardo, Schottel Hydro, Twentsche Kabelfabriek (TKF), Vryhof Anchors, Royal Netherlands Institute for Sea Research (NIOZ), Nylacast, the Tidal Testing Centre, and the Port of Den Helder bundles extensive experience in the maritime and offshore industry in the field of design and operation of mooring platforms, shipbuilding, offshore dredging and installation, tidal turbines, power cables, anchors, research at sea and synthetic materials.

This platform can be shipped and installed anywhere in the world to provide clean electricity, ideally suited to remote areas and small islands, replacing expensive and polluting diesel generators.

The BlueTEC platform was developed for cost-effective installation, operations and maintenance of tidal turbines. It accommodates all vulnerable electronic equipment inside the unit, where it is dry and protected, yet allowing for easy access for inspection, maintenance and repair. The platform can be disconnected from the moored location and taken to a local port for heavy repair when needed.

The platform is targeted at remote locations worldwide, it can be shipped in containers anywhere in the world and can be assembled locally and installed without sophisticated equipment. The system can provide clean electricity in remote areas and small islands with tidal currents, replacing expensive and polluting diesel generators. An important advantage of tidal energy is its predictability and consistency, bringing stability to local electricity grids.

www.bluewater.com/new-energy/texel-project/



BlueTEC's tidal energy platform with
Tocardo T2 turbines installed giving 500 kW
(Image from Damen website)

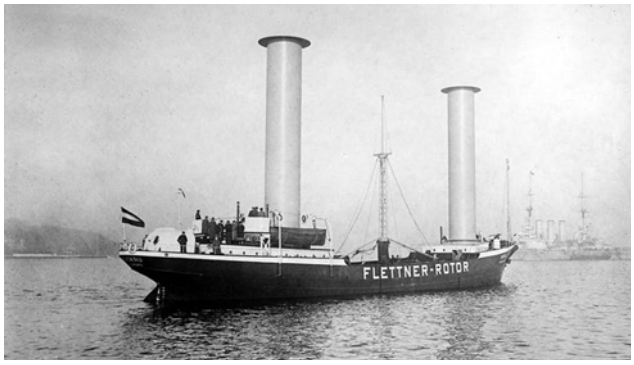
Flettner Rotors for Ships

Early next year, a tanker owned by Maersk, the Danish transportation conglomerate, and a passenger ship owned by Viking Line will be outfitted with spinning cylinders on their decks. Mounted vertically and up to ten stories tall,

these "rotor sails" could slash fuel consumption up to 10%, saving transportation companies hundreds of thousands of dollars and cutting soot-causing carbon emissions by thousands of tonnes per trip.

Rotor sails rely on a bit of aerodynamics known as the Magnus effect. In the 1850s, German physicist Heinrich Gustav Magnus noticed that when moving through air, a spinning object such as a ball experiences a sideways force. The force comes about as follows. If the ball were not spinning, air would stream straight past it, creating a swirling wake that would stretch out directly behind the ball like the tail of a comet. The turning surface of a spinning ball, however, drags some air with it. The rotation deflects the wake so that it comes off the ball at an angle, closer to the side of the ball that's rotating into the oncoming air. Thanks to Isaac Newton's third law, that every action must have an equal and opposite reaction, the deflected wake pushes the ball in the opposite direction, toward the side of the ball that's turning away from the oncoming air. Thus, the spinning ball gets a sideways shove.

In the early 20th century, scientists proposed using the Magnus effect to propel ships. German engineer Anton Flettner replaced 420 m^2 of sail cloth on the schooner *Buckau* with two 15-metre-tall steel rotor sails, which were set spinning using a small engine. Flettner showed that wind traveling around *Buckau*'s rotor sails created a force on the sides of the rotor sails which propelled the ship forward. In 1926, *Buckau* crossed the Atlantic Ocean. However, Flettner failed to find investors interested in rotor sail–powered ships. Fuel prices were simply too low and there were no environmental regulations limiting ship emissions.



Buckau, the first Flettner rotor-powered ship
(Photo from The Conversation website)

But the economic breeze may be freshening for sail power. Today, more than 90% of goods are carried over the ocean, and the Chinese port of Shanghai alone saw 36 million containers pass through in 2015. All that commerce comes at an environmental price: Most vessels burn heavy fuel oil, producing heat-trapping carbon dioxide as well as soot and sulphur compounds which contribute to acid rain. "The shipping industry is under increased pressure to reduce emissions," says Tuomas Riski, CEO of Norsepower Oy Ltd, a clean technology and engineering company headquartered in Helsinki, Finland.

Norsepower has developed a rotor sail based on Flettner's original design, but updated with modern materials such as carbon and glass fibres, which cut its weight by a factor of three. That means that less electricity is required to spin the rotor, which translates into more-efficient propulsion. "Our largest rotor sails can provide forward thrust equivalent of up to 3 MW of main-engine power while drawing less than 90 kW of electricity," Riski says. Norsepower's design is also linked to software which adjusts a rotor's rate of rotation—up to several hundred revolutions per minute—to maximise forward thrust. "It's fully automatic and simple to use," Riski says.

The technology also should be safe, as cutting electricity to the rotor stops the propulsion and leaves only a drag force. And that drag force is probably much less significant than the drag the ship's hull experiences moving through water, says Jeff Eldredge, a fluid dynamicist at the University of California, Los Angeles. Michael Traut, a physicist at the University of Manchester in the United Kingdom, says "There's no risk of capsizing the vessels."

Rotor sails are generally effective if the wind is moving faster than 18 km/h—roughly 10 kn—and is blowing across the ship's bow at an angle of at least 20°. Ships often encounter such conditions on northern Pacific and northern Atlantic shipping routes, Riski says. Unlike Flettner's original rotor sails, the new versions are intended to only provide supplemental thrust rather than entirely replace a ship's engine.

In 2015, Norsepower conducted successful at-sea tests of its rotor sails on the cargo ship *Estraden* which carries cars and trucks between the Netherlands and the United Kingdom. When retrofitted with two 18 m high rotor sails, the ship burned 6% less fuel. Next year, after Norsepower installs rotor sails on an oil tanker and a passenger cruise ship, "we'll have all of the main ship types covered," Riski says. Container ships are not a good fit for rotor sails because their decks are stacked with containers, he notes.

Time will tell whether this new take on old technology is successful. "One of the drawbacks of Flettner's original rotors was that the power required to rotate them was too significant to make them practical," Eldredge says. "But with novel materials that problem might be solved. Still, it remains to be seen whether we'll be seeing a bunch of cargo ships with Flettner rotors."

Katherine Kornei

www.sciencemag.org/news, 6 September 2017

[*See also Kuuskoski, J. (2017), Norsepower Rotor Sails — Efficient and Reliable Auxiliary Wind Propulsion for Ships*, Proceedings Power and Propulsion Alternatives for Ships Conference, *RINA, Rotterdam, 8 November* — Ed.]

Estraden, with Flettner rotors providing supplementary power
(Photo courtesy Josh Harrison)

Japanese Shipping Line to Test Unmanned Container Ships

Nippon Yusen KK will remotely pilot one of its large container ships from a Japanese port to North America, although the company added that a crew will be aboard as a precautionary measure for the initial test voyage, Bloomberg reported. The voyage is being planned by the Monohakobi Technology Institute, which is a division of the shipping firm, and will be a step towards the abolition of crews aboard ships.

The shipping industry believes that doing away with crews will significantly reduce costs and improve safety. Operators say the majority of accidents in the £260 million-a-year industry are caused by human error.

That suggestion has been borne out by the collision off Singapore recently between a merchant oil tanker, *Alnic MC* and US Navy warship, USS *John S. McCain*. The search-and-rescue operation for nine missing US navy personnel was called off and efforts to locate the missing then focussed on the destroyer's flooded internal compartments.

Nippon Yusen is collaborating with radar and communications equipment companies to develop accident-avoidance technologies in large unmanned vessels.

The Japanese government is supporting efforts to develop fully automated commercial ships and has set a target of 250 domestically-built ships being equipped with autonomous operation technology by 2025.

www.nauticalsimulation.com, 31 August 2017

World's First Hydrogen-powered Cruise Ship Scheduled

Viking Cruises has joined the ranks of shipping companies working to introduce fuel-cell technology with the recent announcement of plans to build the world's first cruise ship fuelled by liquid hydrogen.

Project manager, Serge Fossati, told a shipping conference in Norway that the ship will be around 230 m long and will accommodate more than 900 passengers and have a crew of 500. She will be based on the design of the cruise line's other ocean-going ships, such as *Viking Sun*. Several tender ships to carry the fuel to the cruise ship are also part of the project.

So far, liquid hydrogen has not been used as marine fuel. A fuel cell will convert the hydrogen to electricity for propulsion and electric power on board. A fuel-cell power pack consists of a fuel and gas-processing system and a stack of fuel cells which convert the chemical energy of the fuel to electric power through electrochemical reactions. The process can be described similar to that of a battery, with electrochemical reactions occurring at the interface between the anode or cathode and the electrolyte membrane, but with continuous fuel and air supplies. Different fuel cell types are available, and can be characterised by the materials used in the membrane.

One of the technical challenges is to maintain the liquid hydrogen fuel at minus 253°C to keep it from evaporating. Hydrogen is also a very explosive gas, and protection against gas leaks is an important part of the safety requirements for the fuel.

The ship is likely to be registered in the Norwegian International Ship Register, and the cruise line is already in discussion with the Norwegian Maritime Authority.

"This is a world sensation. Very exciting. If they pull this off, a distribution network may be established, which will enable others as well to use hydrogen as fuel and could contribute to a zero-emission shipping industry," says Norwegian Maritime Authority Director General of Shipping and Navigation, Olav Akselsen. "We probably have a way to go before all the technical solutions are in place, but this is a very concrete project which has a high priority at Viking Cruises."

At present, liquid hydrogen is not produced on a large scale in Europe, but Fossati says that Viking Cruises is in dialogue with Statoil in order to find a solution based on a Norwegian refinery. He wants to use Norwegian suppliers for the project as far as possible.

Viking Cruises has ordered eight cruise ships which will fly the Norwegian flag. *Viking Sun*, the fourth of these ships, was delivered from the Fincantieri shipyard in Italy on September 25.

Nautical Simulation website, 17 October 2017

Team Britannia

The Team Britannia attempt to take the power-boat record for the round-the-world voyage did not commence in October. The website now says:

"Construction of the boat started at the beginning of June 2016, and the important hurdle of turning the hull over was passed at the beginning of December. Completion of the boat, which includes attaching the wheelhouse, flybridge and decks, along with fuel tanks, engines, jet drives and interior fittings, continues through 2017, with launching expected very early 2018. After the boat is in the water, there will be a comprehensive programme of sea trials and record attempts prior to the circumnavigation itself later in the year."

www.teambritannia.co.uk

Jenny Wren sailing during the Sydney Amateur Sailing Club's Gaffers Day on 8 October. She was designed by Walter Reeks and built by Thomas Cubitt in Berrys Bay, NSW, in 1889. She is one of the oldest racing yachts still in existence in Australia (Photo John Jeremy)

GENERAL NEWS

Austal Secures Large Ferry Contract

On 24 August Austal announced a new contract valued at €73 million ($A108 million) to design and build a 109 m high-speed vehicle and passenger ferry for Fjord Line of Norway.

The all-aluminium catamaran, designed by Austal Australia, will be the 8th large high-speed commercial ferry of over 100 m in length to be built by the company.

Announcing the contract, Austal's Chief Executive Officer, David Singleton, thanked Fjord Line Chairman, Peter Frolich, and Chief Executive Officer, Rickard Ternblom, for Australia's latest export shipbuilding contract.

"We're very excited to be building this evolutionary new ship for Fjord Line — one of the world's leading commercial ferry operators.

"This valuable export contract will create outstanding opportunities for our design, production and project management teams here in Australia," Mr Singleton said.

"This significant new project also offers new export opportunities for our supply chain partners and thereby ultimately contribute to Australia's sovereign shipbuilding capability," he added.

Austal's latest high-speed commercial ferry will transport 1200 passengers at up to 40 kn and features the company's largest-ever vehicle-carrying capacity with a beam of 30.5 m enabling 404 cars to be carried across two decks.

The new vessel encompasses several key design innovations which enhance operating performance and passenger comfort, including a new, optimised hull form which will minimise fuel consumption and wake wash when operating on the Skagerrak Sea between Hirtshals, Denmark, and Kristiansand, Norway. A business-class lounge for up to 184 passengers, a large (250 m^2) duty-free shop, two bistros, two bars and a children's play area will establish a new benchmark for on-board customer experience.

Fjord Line's latest addition will join their fleet of four commercial passenger ferries operating in the Scandinavian region following delivery from Austal's Australian shipyard in January 2020.

With another 109 m high-speed vehicle passenger ferry (for Molslinjen of Denmark) currently under construction at the Australian shipyard, and a 56 m high-speed passenger ferry (for FRS of Germany) under construction in the Philippines, Austal's commercial vessel portfolio continues to expand. Pursuing a robust commercial ferry sales pipeline, at its highest level in a decade, Austal anticipates additional export orders throughout the remainder of the 2017–18 financial year.

Acknowledging the growth in Austal's commercial vessel portfolio and the opportunities for expansion ahead, David Singleton remarked; "We have previously indicated that the commercial ferry market is strengthening markedly and we accordingly expect further orders for vessels in the near future. We have also indicated that we are likely to expand capacity in both Henderson and in the Philippines. We have completed the first phase of that following the opening of our Hope Valley Road facility in Western Australia and will now press ahead with expansion plans to more than double the footprint of our Philippines facility, although the details of this will be subject to a separate announcement. Further expansion in Henderson beyond this will depend on the outcome of the OPV tender for the Commonwealth of Australia."

The 109m high-speed vehicle and passenger ferry to be built by Austal for Fjord Line of Norway
(Image courtesy Austal)

Austal Ferry Order for Philippines Shipyard

On 24 August Austal announced the fifth high-speed commercial ferry order for Austal Philippines in just over 12 months.

VS Ferries Corporation of Samar in The Philippines has awarded a $A5.5 million contract to Austal for the construction of a 30 m all-aluminium catamaran, designed by Incat Crowther.

Announcing the contract, Austal's Chief Executive Officer, David Singleton, thanked VS Ferries Corporation Chairman, Sidney Zosa, and highlighted Austal's competitiveness in the international high-speed commercial vessel market.

"Austal's reputation for building high-speed commercial vessels over the past 30 years is second to none, and this latest contract from VS Ferries reflects that confidence in our proven shipbuilding capabilities.

"In just five years of operation, Austal Philippines has delivered 13 vessels and established a highly-efficient workforce, utilising advanced, modular shipbuilding techniques developed right here in Australia," Mr Singleton said.

"Our innovative production processes and new focus on 'producibility' is delivering a genuine competitive advantage across our shipyards and achieving real savings for our operations and customers," he added.

Construction of the new ferry, with capacity to carry up to 300 passengers at speeds of up to 25 kn, commenced in September with delivery scheduled for August 2018.

Sustainment Contract for Austal

On 3 October Austal announced that the Royal Australian Navy (RAN) had awarded Austal a sustainment contract worth up to $18 million over three years for the Cape-class patrol boats *Cape Fourcroy* and *Cape Inscription*.

The contract will employ eight directly and 20 indirectly in local contractors and Austal's own facilities in the Cairns area. The sustainment work will be in addition to the work undertaken by Austal for the Australian Border Force and will utilise much of the same experience and capabilities.

Austal's 58 m Cape-class patrol boat was specially designed and built to meet the unique border protection and maritime security requirements of the Australian Border Force and Royal Australian Navy.

Austal Contract for Two Trimaran Ferries

On 8 October Austal announced a contract, valued at €126 million ($A190 million), to design and build two 117 m high-speed vehicle passenger trimaran ferries for long-term customer Fred Olsen S.A. of the Canary Islands, Spain.

The aluminium trimarans, designed by Austal Australia, will be the second and third trimarans to be delivered to Fred Olsen S.A. who already operates the world's first and largest trimaran vehicle passenger ferry, *Benchijigua Express*, which was designed and built by Austal in 2005.

Austal has led the world in designing large aluminium trimarans for the ferry industry to answer a desire for improved passenger comfort over traditional catamaran designs. This innovation led to the development of the Littoral Combat Ship (LCS) for the US Navy.

Austal's Chief Executive Officer, David Singleton, thanked Fred Olsen S.A. and the Olsen family for the company's continued partnership and investment in Austal's innovative trimaran technology and shipbuilding expertise.

"It is truly exciting to announce this major shipbuilding contract with Fred Olsen, who had the courage and foresight to work with Austal's advanced trimaran technology in developing *Benchijigua Express* in 2005," Mr Singleton said.

"*Benchijigua Express* has become an industry benchmark for blue-water commercial ferry operations, exceeding expectations for performance, speed and customer experience in the Canary Islands."

Austal's Vice President of Sales and Marketing, Ben Marland, added "This is a watershed contract for our next-generation trimaran design which will deliver new levels of seakeeping, passenger comfort and efficiency, and proves that the trimaran is the right tool for the job in the challenging sea conditions of the Atlantic. It is a game-changer in the market."

The two new trimarans will each be capable of transporting over 1100 passengers and up to 276 cars at speeds of up to 38 kn, with both commencing construction in 2018. The vessels are due for delivery in 29 and 36 months. The build location for the vessels will be announced separately.

Austal Wins First Commercial Vessel Contract in Taiwan

On 4 September Austal announced its first commercial contract award in Taiwan, valued at $A44 million.

The contract is for two 550 passenger, 50 m high-speed catamarans, to be designed and built by Austal for Taiwan's Brave Line. The contract includes an option for a third vessel of the same design.

"I'm delighted to welcome Brave Line as a valued customer of Austal. This contract builds on the continuing evolution of our fast-ferry portfolio and reaffirms Austal's position as international market leader for the quality of the vessels which we design and build" Austal's Vice President of Sales and Marketing, Ben Marland, said.

Austal's Chief Executive Officer, David Singleton, added "Eighty per cent of the ships we build are for export with the design work centred at our Henderson facility.

"Our 100-plus strong design team, the largest in Australia, is continuing to produce sophisticated designs which deliver against challenging customer requirements," he said.

"Austal has previously indicated continuing strength in the worldwide ferry industry and this adds to our recent record run of sales achieved over the last 18 months."

The Brave Line catamarans will be designed by Austal in Australia and built at Austal's shipyard in the Philippines. The shipyard has delivered ten vessels for five international customers during the last five years. Austal has recently announced its intention to expand capacity in this shipyard through a $US30 million investment in new infrastructure. The expansion is intended to cater for an increase in new orders already achieved with further orders expected in the next 12 months.

Austal US Navy Contract for LCS 30

On 9 October Austal announced that it has won a further contract for the Independence Class, Littoral Combat Ship (LCS) to be built at its shipbuilding facilities in Mobile, Alabama. This is the second LCS vessel to be awarded this year to Austal.

The 127 m LCS 30 will be the 15th LCS constructed at Austal's US shipyard in Mobile.

Austal's Chief Executive Officer, David Singleton, said that the announcement is further proof that the Australian industry can not only compete, but excel, on the world stage.

"Whilst this is a great achievement for Austal, I am also delighted in the vote of confidence which this delivers in the Australian industry for shipbuilding and design," Mr Singleton said.

"I am particularly impressed by the productivity gains and quality of build that our workforce in Mobile has achieved — what they have delivered over the last few years is nothing short of outstanding. The performance in the USA is fast becoming the benchmark for naval production in the world and an inspiration to all of us. Austal's work on the LCS program at our advanced Module Manufacturing Facility (MMF) has seen efficiency gains of 20 per cent so far with an ambitious target of 35 per cent set for the end of the build cycle.

"Austal USA employs 4000 people at its headquarters and shipbuilding facility in Mobile, Alabama, while its supplier network includes over 2200 businesses across 43 states. This operation is truly part of a national endeavour in the USA, and is a model for Australia's shipbuilding industry where continuous shipbuilding drives innovation and productivity, and provides many benefits to the national supply chain and education industry."

The ship's company marching on board the new guided missile destroyer HMAS *Hobart* at her commissioning in Sydney on 23 September
(RAN Photograph)

Two Additional Pacific Patrol Boats

The Prime Minister, Malcolm Turnbull, and Timor-Leste Prime Minister, Mari Alkatiri, announced on 6 November that Timor Leste would take two of Austal's Guardian-class Pacific Patrol Boats (PPBs). When contracted this will increase the total production quantity to 21 from the 19 already committed.

Following on from a visit to Austal's dedicated patrol boat facility earlier that day, Prime Minister Alkatiri joined Prime Minister Turnbull to make the announcement, heralding a step forward in regional cooperation.

Austal's Chief Executive, David Singleton, said "The PPB program is intended to aid regional security in the South Pacific by helping to secure the Timor Leste's maritime border and represents an example of defence diplomacy fostering close relations between countries in the Asia-Pacific."

"The first of the current order of Guardian-class patrol boats is already well into its construction phase and is running on time and on budget. Handover of the first vessel is projected to be in the third quarter of calendar year 2018," Mr Singleton said.

"The Guardian-class patrol-boat project at Austal is supporting 200 direct jobs and a further 200 indirect jobs in the broader industry. This is in addition to several hundred more jobs supported by a large commercial export ship currently being built in the Henderson yard," he said.

"We are working on other export opportunities for the Guardian-class patrol boat, thereby helping Australia sustain its sovereign naval shipbuilding industry which has already delivered over 40 patrol boats to international customers," Mr Singleton said.

The Pacific Patrol Boat contract was awarded to Austal in May, 2016 and is worth $305 million for the original 19 vessels and associated in-service support.

Taylor Bros of Tasmania to build barges for Australian Antarctic Division's RSV *Nuyina*

Damen Schelde Naval Shipbuilding (DSNS) has selected Taylor Bros of Tasmania to supply two high-powered Antarctic landing barges for Australia's new icebreaker, RSV *Nuyina*. Damen is building the vessel at its yard, Damen Shipyards Galati, in Romania for the Australian Antarctic Division (AAD). The vessel will be operated by DMS Maritime, a wholly-owned subsidiary of Serco, and is an integral part of the AAD's research program in Antarctica and the Southern Ocean.

The signing ceremony in November was attended by the Tasmanian Minister for State Growth, Peter Gutwein, and Damen Australia Project Director, Magiel Venema.

Roland Briene, Damen Area Director Asia Pacific, said "This contract with Taylor Bros demonstrates Damen's strong conviction in the maxim 'think global, act local'. Wherever we operate in the world we work closely with local suppliers and service providers, participating in knowledge-sharing initiatives which work in the interests of all parties. Taylor Bros was a natural choice for this contract, having delivered a number of projects to the AAD previously. Tasmania in general has an excellent reputation for being one of the most effective manufacturing, supply and support bases for Antarctic research."

The barges, which are being designed, engineered and built locally, will carry 45.5 t trucks from ship to shore on a continuous basis, giving the new icebreaker an unprecedented capability for unloading and reloading. The barges will be completed in 2020, when *Nuyina* begins her operations, replacing the current vessel, *Aurora Australis*.

Nuyina (a Tasmanian Aboriginal word meaning 'Southern Lights') represents a state-of-the-art solution which will facilitate Australia's wider exploration of Antarctica and the Southern Ocean. The vessel will be 156 m in length, with a beam of 25.6 m. She will be able to break ice up to 1.65 m at speeds of 3 kn and will supply Australia's research stations in Antarctica and Macquarie Island with cargo, equipment and personnel. With a 500 m^2 laboratory and office facilities, the vessel will also serve to conduct research activities. *Nuyina* will host up to 32 DMS Maritime crew and as many as 116 AAD scientific personnel, plus a doctor, in climate-controlled accommodation.

An impression of RSV *Nuyina*
(Image courtesy Damen/AAD)

The first block of *Nuyina* was placed in the building dock in Galati, Romania, on 24 August
(Photo courtesy Damen/AAD)

Upgrades Underway at HMAS *Stirling*

On 11 November the Minister for Defence, Senator the Hon. Marise Payne, and Senator for Western Australia, Slade Brockman, attended a sod-turning ceremony to officially mark the commencement of construction work at HMAS *Stirling* which will deliver upgraded infrastructure and services to support Royal Australian Navy's operations in the Indian Ocean.

"HMAS *Stirling* is one of Australia's most important naval bases and this investment will modernise essential infrastructure, such as the wharves, power, water and security systems," Minister Payne said.

Senator Brockman said that the project is expected to create around 150 skilled construction jobs over next two-and-a-half years, with local businesses expected to play a significant role in delivering the upgrades.

"This project is an excellent example of local businesses benefiting from upgrades to our Defence facilities and training areas," Senator Brockman said. "The project has already awarded the first three contracts to local companies for the causeway armour, concrete remediation and fender steelwork trade packages for a combined value of $37 million."

The remaining 19 trade packages are expected to be awarded in the coming months. Construction is expected to be completed in early 2020.

Cairns Marine Precinct Upgrade

On 31 August the Minister for Defence Industry, the Hon. Christopher Pyne MP, and Federal Member for Leichhardt, Warren Entsch, announced the Government's provision of $24 million toward the upgrade of the Cairns Marine Precinct.

The Cairns Marine Precinct provides vital facilities and support services to the ADF and a critical contribution to the local economy and local jobs.

Agreements have now been signed with Norship Marine, BSE Cairns Slipways and Tropical Reef Shipyard with funding to flow from the Government to undertake a variety of works to increase the capability and capacity of the existing shipyards.

Minister Pyne said that the projects will include over 170 m of wharf construction, upgrades to electrical and fire systems, workshop construction, security systems, hardstand resurfacing and construction of an additional 135 m of slipway rail.

"Cairns provides vital facilities and support services to the Australian Defence Force, and this upgrade work will mean they are well placed to keep doing so into the future.

"More than $400 million of maintenance work on the replacement fleet of up to 21 Pacific Patrol Boats will be conducted here," he said.

The Norship Marine yard in Cairns
(Photo courtesy Norship Marine)

Mr Entsch said that the delivery of this commitment will ensure that Cairns is well placed to secure additional maintenance and sustainment work for commercial customers and the Royal Australian Navy. Over 1300 people are employed in the shipbuilding, repair and service sectors in the region.

"This work will sustain immediate construction jobs, and also long-term shipbuilding and maintenance work right here in Cairns," he said.

This $24 million investment is in addition to the Government's $420 million investment to develop additional wharf space and other support facilities at HMAS *Cairns*.

While the Government is investing in the upgrades, the works themselves will be managed by the shipyards involved.

Five-hundredth Incat Crowther Vessel Launched

Incat Crowther has passed a significant milestone with the launch of their 500th vessel, *Champion*. Fittingly, the 27 m catamaran passenger ferry was built by Gladding-Hearn Shipbuilding, and demonstrates the long-term win-win collaborative relationships that are core to Incat Crowther's culture.

Incat Crowther's CEO, Brett Crowther, says "To have successfully designed 500 large commercial vessels is no accident. Incat Crowther will continue to invest in our people and processes to deliver innovative yet practical technical solutions to our operators and shipbuilding partners. It's apt that our 500th vessel is a Gladding-Hearn build. We've built many vessels together and our philosophies align."

Peter Duclos, Director of Business Development at Gladding-Hearn, said "Gladding Hearn's philosophy is to build commercial vessels which make our customers successful. This vessel for the Massachusetts Bay Transit Authority is a great example of the robust passenger transit vessels we are so well known for."

Champion on trials
(Photo courtesy Incat Crowther)

Seating 110 passengers internally and having a total capacity of 150 passengers, *Champion* meets a range of performance and functional criteria. As well as being fully ADA complaint, with a total of four wheelchair spaces and an accessible bathroom, the vessel also features a concession area, luggage rack, bicycle storage for ten and a ticket counter.

The design is optimised for bow loading, with double-width gates and doors. The bow design integrates with the existing shore-based infrastructure and the wheelhouse is designed to meet strict visibility requirements, allowing the captain to clearly see the foredeck.

Champion's superstructure is isolated on resilient mounts to reduce noise and vibration in the cabin, allowing the vessel to exceed the contractual requirements.

Champion is powered by a pair of Caterpillar C32 ACERT engines, driving Hamilton HM571 waterjets, for a service speed of 26 kn and a top speed of 30 kn.

Principal particulars of *Champion* are

Length OA	27.15 m
Length WL	24.6 m
Beam OA	8.50 m
Depth	2.80 m
Draft (hull)	1.30 m
Passengers	150
Crew	3
Fuel oil	6056 L
Fresh water	757 L
Sullage	757 L
Main engines	2×Caterpillar C32 ACERT each 1081 kW @ 2100 rpm
Propulsion	2×Hamilton HM571 waterjets
Generators	2×John Deere/Marathon 47 ekW
Speed (service)	26 kn
(maximum)	30 kn
Construction	Marine-grade aluminium
Flag	USA
Class/Survey	USCG Subchapter T

SEACOR Puma and *SEACOR Panther* from Incat Crowther

Incat Crowther has announced the delivery of SEACOR Marine's next generation CrewZer-class catamarans, *SEACOR Puma* and *SEACOR Panther*. The vessels were built by Astillleros Armon in Spain and are unique in their capability to transfer personnel and equipment to offshore platforms at maximum speeds in excess of 40 kn. Following the proven operational success of previous Incat Crowther high-speed vessels designed for SEACOR Marine, the company commissioned Incat Crowther to develop this next generation design. The new design features 30% more deadweight capacity than its predecessor, whilst offering equivalent service speeds.

SEACOR Puma and *SEACOR Panther* retain the structure and certification for 150 passengers of their predecessors, but are fitted out in a more comfortable 76 seat configuration with an overnight crew cabin. All 76 passengers are accommodated in large reclining seats, fitted with privacy partitions, reading lights and device-charging ports, equivalent to long-haul airline business class. The main deck also features a hospital, ship's utility room, self-service café bar and four passenger bathrooms. Modern surfaces, furnishings and LED lighting complete the comfortable experience.

Upstairs, the wheelhouse is ergonomic and functional with dedicated work spaces. Vision over both ends of the vessel is excellent from the forward and aft control stations.

SEACOR Puma on trials
(Photo courtesy Incat Crowther)

Crew are housed below deck in spacious, comfortable accommodation. The port hull features a fully-equipped galley, crew mess, two twin cabins and a bathroom. The starboard hull has five twin cabins and a bathroom.

Fitted with four Cummins QSK95 main engines, each producing 2983 kW driving Hamilton HT-810 waterjets, *SEACOR Puma* and *SEACOR Panther* have a top speed of 42 kn. On-station manoeuvring is enhanced through a pair of retractable bow thrusters. Electrical power is provided by two Cummins QSM-11 generators in addition to a deck-mounted standby genset. The DP-2 ABS-classed vessels are also fitted with Class 1 fire-fighting equipment and are very capable fast offshore vessels.

Principal particulars of *SEACOR Puma* and *SEACOR Panther* are

Length OA	157.25 m
Length WL	53.65 m
Beam OA	12.50 m
Depth	4.27 m
Draft (hull)	1.70 m
Passengers	150
Crew	16
Deck Cargo	203.2 t
Fuel oil	96 288 L
Fresh water	26 000 L
Grey water	2564 L
Black water	2564 L
Main Engines	4×Cummins QSK95 each 2983 kW @ 1720 rpm
Propulsion	4Hamilton HT-810 waterjets
Bow thrusters	2×Veth VL-150
Main generators	2×Cummins QSM 11
Standby generator	1×Cummins QSM11
Speed (service)	35–40 kn
(maximum)	42 kn
Construction	Marine-grade aluminium
Flag	Republic of Marshall Islands
Class/Survey	ABS A1, HSC Crewboat, Restricted Service, OE, AMS, DPS-2, FF Capable

Bridge on *SEACOR Puma*
(Photo courtesy Incat Crowther)

Engine room on *SEACOR Puma*
(Photo courtesy Incat Crowther)

Seating in cabin on *SEACOR Puma*
(Photo courtesy Incat Crowther)

Accommodation on *SEACOR Puma*
(Photo courtesy Incat Crowther)

Isle of la Digue from Incat Crowther

Incat Crowther has announced the launch of the 30 m passenger ferry *Isle of la Digue*. Built by Richardson Devine Marine Constructions, *Isle of La Digue* is the latest Incat Crowther-designed vessel for the Seychelles operator Inter Island Express. Requiring a very shallow draft to afford access to the operator's confined harbor berth, *Isle of La Digue* is the first vessel to feature Incat Crowther's innovative new-generation propeller tunnel. The tunnel significantly reduces propeller draft and yet offers a flat transom which can integrate with standard fixed- or active-interceptor systems. Incat Crowther's unique tunnel design was extensively modelled with in-house CFD software prior to being used on an active project.

During sea trials, *Isle of La Digue* demonstrated a six percent fuel saving over the standard hull. The vessel achieved a speed of 32 kn at maximum deadweight, and a very low fuel burn at its operational cruising speed of 28 kn.

In addition, attention has been paid to highly-loaded areas of the vessel's structure, providing a robust and durable vessel capable of operating safely over the longer term on this very demanding run. The structure has been optimised for the route's specific sea conditions, using Incat Crowther's in-house FEA systems.

Isle of La Digue on trials
(Photo courtesy Incat Crowther)

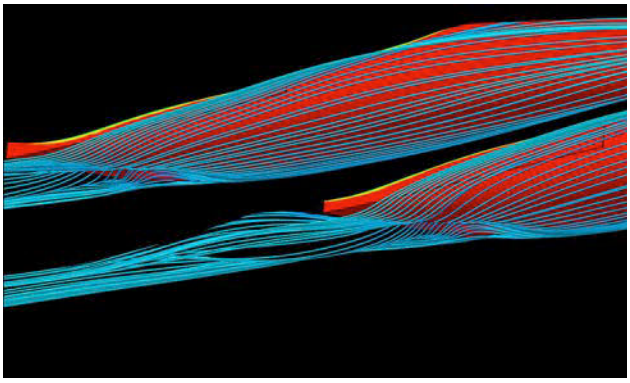
The vessel's 290 passengers are accommodated in three classes. Turnaround time, including baggage handling, has been optimised with four access locations on the port side. Luggage is directly loaded to the enlarged luggage room via the aft-most ramp. Economy passengers are loaded via the next two gates, with those destined for the upper deck afforded a clear path to the aft stairs. At midships, a boarding location is reserved for business-class passengers, who access directly to a dedicated staircase to the business-class cabin.

Multiple features have been implemented to enhance passenger comfort, including the latest-generation centre bow, an active 'high throw' interceptor ride-control system, large viewing windows and integrated blinds in the business-class cabin to reduce heat and glare.

Principal particulars of *Isle of la Digue* are

Length OA		31.9 m
Length WL		29.8 m
Beam OA		9.00 m
Depth		3.25 m
Draft	(hull)	1.30 m
	(propeller)	1.70 m
Passengers		290
Crew		7
Fuel oil		8000 L
Fuel oil (day tanks)		3000 L
Fresh water		1200 L
Sullage		1500 L
Main engines		2×Cummins KTA50-M2 each 1342 kW @ 1900 rpm
Propulsion		2×propellers
Generators		2×Cummins 6B-CP80DM/5
Speed	(service)	28 kn
	(maximum)	32 kn
Construction		Marine-grade aluminium
Flag		Seychelles
Class/Survey		NSCV Class 1C

Stewart Marler



CFD flow visualisation of *Isle of La Digue*'s propeller tunnels
(Image courtesy Incat Crowther)

Isle of La Digue on the Derwent River under the Tasman Bridge
(Photo courtesy Incat Crowther)

Cruising in NSW

The winter quiet saw *Pacific Jewel, Pacific Explorer, Sun Princess, Sea Princess, Golden Princess* and *Carnival Spirit* working out of Sydney, the increasing number of six vessels (up from two a couple of years ago) being indicative of the increasing demand for winter cruises.

The arrival of *Radiance of the Seas* on 8 October signalled the start of the next summer season. She was followed by *Celebrity Solstice, Carnival Legend, Maasdam, Noordam,* and *Explorer of the Seas*.

November moved into a higher gear, with return visits by these vessels plus *Norwegian Jewel, Voyager of the Seas,* and *Amsterdam*.

Vessels berthing regularly at the Overseas Passenger Terminal at Circular Quay is a sure sign that the summer cruise season is under way.

Phil Helmore

John Butler Design

Having recently finalised their accreditation as AMSA surveyors, John Butler Design has noted an increase in the number of surveying and survey-consultancy projects. This has provided good resilience in a changeable market with the reshaping of the survey system, and is a further sign of a shift towards using smaller, local independent surveyors or companies which are more practically positioned and able to act quickly.

SMB *John Gowland* Stability

John Butler Design was recently engaged by BAE Systems to undertake the inclining experiment and stability analysis of SMB *John Gowland* at Noakes Boat and Shipyard in Sydney. Built in 1993, the vessel has undergone various refit work over the years which added to the complexity of the project. The inclining was a success and she is now back in service training students.

Port Bow of SMB *John Gowland*
(Photo courtesy John Butler Design)

Carnival Cruises Install New Water Parks and Water Slides

John Butler Design and Carnival Australia have shared a long and prosperous relationship that has been built on reliability and the delivery of clear, concise solutions. The recent raft of refit work in the Carnival cruise fleet saw JBD engaged to analyse the structural and practical implications of fitting a water park and its primary and ancillary services to the top deck of *Pacific Dawn* and *Pacific Explorer*. Due to the position and size of the water park and its slides, modifications to the funnel structure and its fairings were necessary. JBD conducted a detailed FEA study into the effects on the funnel structure, and the additional dynamic loads induced by the slides and Water Park.

JBD was onsite at the yard in Singapore to oversee the production and installation of the water park and the modifications. JBD provided project management, consultation and support at the ship, liaising directly with designers, classification society surveyors and production managers to ensure a safe, smooth refit process. Given the operational profile of the ship, strict deadlines were imposed on this project, and the deadlines were met.

Pacific Explorer showing off her new water park and water slides
(Photo courtesy John Butler Design)

Waterslide installation on *Pacific Explorer*
(Photo courtesy John Butler Design)

Waterslide under test on *Pacific Explorer*
(Photo courtesy John Butler Design)

John Oxley Restoration

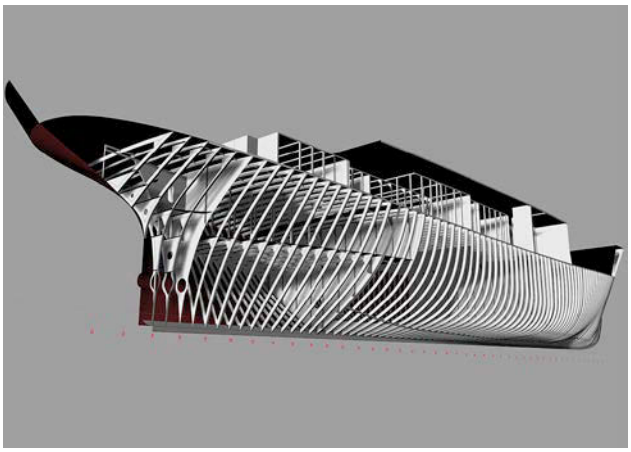
The Sydney Heritage Fleet has been working tirelessly for years to refit *John Oxley*, a 1927 steam-driven pilot vessel, to ensure that Australia's maritime heritage is not forgotten. John Butler Design has worked alongside the SHF team and their loyal volunteers over the last few years, and volunteered their services to provide stability analysis and consultancy services to ensure that the refit will allow for an operational profile which will permit *John Oxley* to implement the education and training programs currently running on the other SHF vessels which sail out of Sydney.

SHF intend to keep her as a steam-powered vessel, which was a challenge when analysing the damaged stability case for the engine room, which also currently houses the two large Scotch boilers side-by-side. A subdivision has been considered to comply with the damaged stability criteria, which wasn't a requirement when the vessel was built.

The extent of the restoration has proved to be substantial, with all exterior plating to be replaced thanks to extensive corrosion.

A 3D model has been created to accurately estimate the vessels mass and centre of gravity. This allowed a preliminary stability analysis to be undertaken on the vessel to assess the feasibility of future cruises.

Starboard quarter of *John Oxley*
(Photo courtesy John Butler Design)



John Oxley structural model
(Image courtesy John Butler Design)

11.5 m Fishing Charter Vessel From John Butler Design

John Butler Design has recently designed and built an 11.5 m aluminium monohull fishing charter vessel. This is part of a growing collection of designs which, until recently, consisted primarily of varying types of barges. These range from static towed barges, to motorised hydraulically-lifted barges, and lightweight knockdown assembly barges for remote access and easy transportation.

Principal particulars of the new vessel are

Length OA	11.5 m
Length WL	11.4 m
Beam	3.50 m
Depth	1.60 m
Draft	0.90 m
Passengers	12
Crew	2
Fuel oil	960 L
Fresh water	130 L
Main engine	Volvo D4 225
Propulsion	Fixed-pitch propeller
Speed	22.5 kn
Construction	Marine-grade aluminium Transversely framed
Class/Survey	NSCV Class 2C

Starboard side of 11.5 m monohull fishing charter vessel
(Photo courtesy John Butler Design)

Framing of the unturned hull structure of
11.5 m fishing charter vessel
(Photo courtesy John Butler Design)

Zeus from John Butler Design

John Butler Design has completed the design and commissioning of Zeus, an 18 m road-transportable piling barge, complete with deck crane and piling frame. The vessel was manufactured by Performance Engineering for Dick Rowe Marine. JBD undertook the initial plan approval, and liaised with AMSA to provide certificates of survey and operation.

Zeus's primary role is as a piling barge for use with marina installation and maintenance. It has a piling frame with a 7 t pile driver, as well as a deck crane capable of lifting up to 6.5 t.

The design features a combination of internal cargo/office spaces, fire-suppressed generator space and open hardwood-covered working-deck space.

The barge was assembled using three pontoons, transverse connecting beams, bolted piling frame and crane installations. Each component was small enough to transport by truck to any location in Australia.

AMSA EX41 was applied to negate the need for handrails surrounding the barge, which can interfere with day-to-day operations on the barge

Principal particulars of *Zeus* are

Length OA	18.26 m
Beam OA	8.85 m
Depth	1.50 m
Draft	0.50 m (lightship)
Displacement	62.3 t (lightship)
Construction	Steel
Class/Survey	NSCV Class 2D

John Butler

Zeus at work
(Photo courtesy John Butler Design)

Inpex Completes Mooring of World's Largest Semi-submersible Platform

The world's largest semi-submersible production platform, *Ichthys Explorer*, has been safely moored in the Inpex-operated Ichthys Field, 220 km off the north coast of Western Australia, where it will be located for 40 years. The Central Processing Platform has a mass of 120 000 t, with a topsides footprint measuring 130 m × 120 m.

"The safe and efficient mooring of *Ichthys Explorer* in the 250 m deep waters of the Ichthys Field, marks another significant milestone for the Inpex-operated Ichthys LNG Project," Louis Bon, Managing Director, Ichthys LNG Project, stated. "The complex operation of connecting 28 pre-installed mooring chains, with a mass of more than 25 000 tonnes, from the seabed to the CPF is testament to the well-coordinated work of our personnel, including contractors and sub-contractors from around globe," Bon said.

The CPF is the central hub for initial offshore processing of all well fluids delivered from an extensive, 130 km network of subsea well infrastructure. Gas from the CPF will be sent through an 890 km subsea pipeline to the onshore LNG facility, at Bladin Point near Darwin, for processing.

Condensate arriving at the CPF will be transferred to a nearby floating production, storage and offloading facility (FPSO), *Ichthys Venturer*.

www.offshoreenergytoday.com, 22 June 2017

Ichthys Explorer under tow
(Photo from www.afr.com)

Rig Anchor Release and Moor-Max Releasable Mooring System

Continuing with its strong tradition of developing innovative mooring solutions, Delmar Systems has introduced the new RAR Plus™ and the MOOR-Max™ Releasable Mooring Systems.

The RAR Plus is the next generation of rig anchor release (RAR), building on a 35-year history of proven acoustic release technology by adding several key features, including a mechanical backup release method. The new backup method ensures the ability to release the moorings in the unlikely event that the remote acoustic transmission fails to actuate the RAR. The mechanical backup release bypasses the acoustic, electronic, and hydraulic systems in the RAR Plus, and it can be actuated by either the rig itself or by a nearby support vessel.

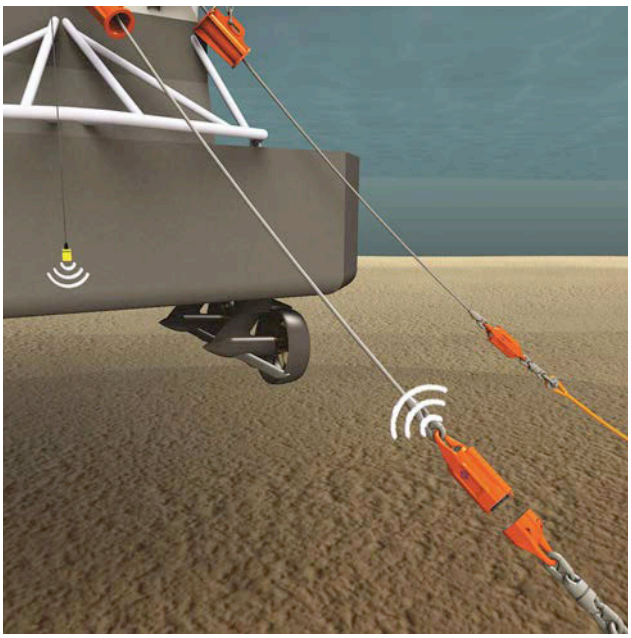
The minimum breaking load (MBL) of the RAR Plus has been increased to accommodate modern R5 high-strength mooring lines. The increased repeatable release load limit allows for disconnection at extreme line tensions. In addition, the RAR Plus transmits both direct and indirect line tension measurements from internal sensors for real-time display onboard the rig in a user-friendly graphical user interface.

The RAR Plus is a key component of the new Delmar MOOR-Max Releasable Mooring System. The MOOR-Max system provides a revolutionary mooring system for MODUs to avoid storms or improve rig move efficiency. It is the only mooring system which combines proven acoustic mooring-release technology with efficient proprietary methods that come from over 40 years of rig move experience. The MOOR-Max Releasable Mooring System is perfectly suited for the moored and DP/moored semi-submersible rig fleet and offers maximum efficiency and flexibility for mixed shallow- and deep-water programs.

Visit www.delmarus.com for more information.

Mark Mithran
Lead Marine Engineer
Delmar Systems

RAR Plus
(Photo courtesy Delmar Systems)



MOOR-Max (RAR Transducer) signal
(Photo courtesy Delmar Systems)

Grant for HMAS *AE1* Search

On 11 November the Minister for Defence, Senator the Hon. Marise Payne, announced that the Government would match private investment to fund an expedition to search for the First World War submarine, HMAS *AE1*.

Minister Payne said that the government would provide $500 000 to allow Find *AE1* Limited to proceed in its attempt to find the submarine and its crew.

"HMAS *AE1* is one of the world's great maritime mysteries and this expedition will be one of the most comprehensive searches for the submarine," Minister Payne said.

HMAS *AE1* was lost without a trace on 14 September 1914 while patrolling waters off then German New Guinea. The cause of the disappearance is not known.

"We owe it to the men of *AE1*, their descendants and the entire navy community to continue to look for those who are forever on patrol.

"It is a story which captivates the maritime community and the Government is proud to join The Silentworld Foundation, Australian National Maritime Museum and Fugro Survey in supporting Find *AE1*. We are also grateful for the cooperation of the Papua New Guinean Government for allowing the expedition in their waters.

"Retired Rear Admiral Peter Briggs and the Find *AE1* team have been working tirelessly to unravel the events and narrow search areas so that we might learn what happened to the brave men who gave everything to protect our country.

"We are hopeful this expedition will find the vessel so we can properly commemorate her loss and preserve what remains."

Multihull Ferries are Very Safe Ferries

Neil Baird

As some will recall, I have, in my dotage, been undertaking a PhD on the subject of fatal ferry accidents and how to prevent them. The intensive study of that subject has been a fascinating and illuminating exercise. My examination of the 750 known fatal passenger vessel accidents in the half century from 1966 to 2015 has thrown up some very interesting and important facts.

Among them has been the realisation that multihull fast ferries have been involved in significantly fewer fatal accidents which, in turn, have led to fewer fatalities than any other type or class of passenger vessel. Obviously, all multihull ferries are likely to be inherently safer because of their stability and multi-compartmented hulls. However, except for the South East Asian "banca"-type trimarans, they seem to be involved in proportionately fewer accidents in the first place.

For the purposes of this work, fast ferries are defined as those having a service speed exceeding 25 kn.

Without exception, all 36 known fatal high-speed ferry accidents have been attributed to human error. Of those, 27 (75 per cent) were either collisions or groundings. Seven (19 per cent) of those 36 accidents involved fast ro-pax ferries and they resulted in a total of nine fatalities, less than two per cent of the total. There have been 554 fast-ferry fatalities but, of those, 318 (or 57 per cent) were the result of just two accidents involving passenger-only fast ferries in Tanzania.

The worst of those involved *Skagit*, a modified, four-engined, Gulf of Mexico crew/supply OSV with additional decks which made it unstable in open sea conditions, particularly when overloaded. That vessel was originally built for Washington State Ferries to operate in the benign waters of Puget Sound on the west coast of the USA. It was sold, via an intermediary, to Tanzania where, soon afterwards, operating in the open Indian Ocean, and apparently grossly overloaded, it capsized killing an estimated 293 people, i.e. 53 per cent of the fifty year fast-ferry fatality total.

Frighteningly, similar vessels are currently operating in the Philippines. They are former crew-supply OSVs which have been converted to ferry operations by the simple but dangerous expedient of adding an extra passenger deck.

Two years later, in 2014, another fast ferry, *Kilimanjaro II*, nose-dived at speed in rough seas off Zanzibar. Twenty-five passengers, who should not have been riding there, were washed off the bow and drowned. There was no notable damage to the ferry and, remarkably, little effort appears to have been made to recover the victims. *Kilimanjaro II* was a very well designed, built and equipped catamaran from the Australian shipyard, Richardson Devine Marine Constructions. It appears to have been operated negligently to the point of recklessness.

Fewer than 20 fast ferries (less than one per cent), of the approximately 2000 that have ever been built, have operated in Tanzania. It is very disturbing, therefore, that 57 per cent of all known fast ferry fatalities have occurred in just two accidents in that country. Having closely observed and experienced ferry operations there, I am unsurprised at that appalling reality.

Notably, seven of the 36 known fatal accidents involving fast ferries occurred in the very crowded Pearl River delta region of China around Hong Kong, Macao and Zhuhai. There are considerably more fast ferries, catamarans and jetfoils, operating in that area than anywhere else on earth. Those seven accidents resulted in 21 fatalities, an average of three per accident with a maximum of four. All were caused by allisions or collisions. Most fatalities were due to impact injuries.

Eleven of the total of 36 fatal fast ferry accidents involved hydrofoils or jetfoils, a disproportionately high percentage of 30 per cent. The *Fast Ferry International* database estimates that fewer than 13 per cent of fast ferries are of the hydrofoil, hovercraft or jetfoil type. It is interesting and telling that five fast ferry owning companies had vessels involved in at least two fatal accidents each. Ten fatal accidents, or 28 per cent of the total, involved Italian-built craft. This, also, is disproportionate.

In terms of the overall safety record of fast ferries, it is very important to note that, while they represent fewer than five per cent of the total global ferry fleet, they have been involved in less than 0.05 per cent of the fatal accidents recorded in the Baird Maritime Passenger Vessel Accident Database. Even more importantly, they were responsible for a mere 0.001 per cent of fatalities. Fast ferries, especially multihulled fast ferries, are very safe ferries indeed. Catamaran fast ferries have not been known to capsize or sink. Trimaran ferries, except for bancas, are not known to have ever been involved in any fatal accidents.

Of the 554 fatalities which occurred in fast ferry accidents, 435, or 79 per cent, involved monohulls, 36 (6.5 per cent) involved hydrofoils and jetfoils and 82, or 15 per cent, catamarans. As catamarans represent 58 per cent of the total fast ferry fleet, monohulls 21 per cent and hydrofoils and jetfoils 13 per cent, catamaran fast ferries are clearly considerably safer than other types.

First published as the Editorial in Work Boat World*, August 2017*

The catamaran ferry *Wight Ryder I* entering Portsmouth Harbour, UK
(Photo courtesy Martin Renilson)

EDUCATION NEWS

Australian Maritime College

AMC to Provide Short Courses in Sydney

The Australian Maritime College at the University of Tasmania will deliver the first courses from its Sydney Study Centre this November, offering career development opportunities for professionals in the maritime and Defence industries.

AMC, based in Launceston, Tasmania, recently announced its expansion into Sydney with the establishment of a study centre at the Australian National Maritime Museum in Darling Harbour.

Two postgraduate degrees — the Master of Engineering in Maritime Design and MBA in Maritime and Logistics Management — will be delivered from this waterfront base from 2018.

In the meantime, a pilot program of two short courses in Supply Chain Management and Fundamentals of Naval Architecture will be delivered in an intensive, five-day format in November 2017.

AMC Principal, Prof. Neil Bose, said that the courses would be delivered by a team of highly-skilled staff and represent an opportunity to receive industry feedback prior to the official opening of the AMC centre in Sydney in January 2018.

"These courses are designed to provide essential insight and overview into the maritime engineering, maritime business and international logistics fields," Prof. Bose said.

"AMC is excited to be able to offer its internationally-recognised maritime training and education from the Australian National Maritime Museum, right in the heart of Sydney's waterfront precinct. We look forward to establishing our presence here, and working with the surrounding Defence, government and private industries to help develop our maritime leaders and shape the future of this vital sector."

Completion of the short courses and assessments will provide credit towards formal qualifications within AMC's postgraduate courses.

World-class AUV Launched by AMC in Tasmania

An innovative autonomous underwater vehicle (AUV) capable of diving up to 5000 m, operating underneath the ice and gathering data on Antarctic research missions was unveiled in August at the University of Tasmania's Australian Maritime College (AMC).

During an official ceremony, the $5 million polar vehicle was granted the name *nupiri muka*, which means 'Eye of the Sea' in *palawa kani*, the language of Tasmanian Aborigines.

nupiri muka is funded by the Australian Government through the Antarctic Gateway Partnership — a $24 million Special Research Initiative of the Australian Research Council (ARC) which aims to provide new insights into the role of Antarctica and the Southern Ocean in the global climate system. AMC contributed $3 million to the cost of the vehicle.

The vehicle will be maintained and operated by a team of specialist research and technical staff at AMC's Autonomous Maritime Systems Laboratory, a new engineering research facility which was also formally opened at the College on 22 August.

University Vice-Chancellor, Prof. Peter Rathjen, said that the AMC had developed a nationally-recognised strength in specialised research and technologies, such as the design and use of autonomous devices and related capabilities, blended with the University's expertise in human factors design, robotics and sensing technologies.

"This new facility will advance the signature contributions of the University and its partners to climate sciences, and Antarctic and Southern Ocean research. There are also rich opportunities at AMC for Tasmania to explore the application of these new technologies to modern naval defence, marine biosecurity and cyber marine opportunities, for example.

"AMC is well placed to host a centre of innovation which builds on the capabilities which it has developed as well as drawing in new businesses," he said.

University Provost, Prof. Mike Calford, said "The College works closely with local, national and international agencies to undertake research and develop capability in maritime engineering, exploration sciences and offshore decommissioning, among a range of specialist activities. The power of this funding is that it allows us to take undertake groundbreaking research in a particular field while growing and adapting our capacity for possible new endeavors for the region."

The AUV is a vital research tool which will be deployed in the Antarctic by Australian and international researchers, including from the ARC Antarctic Gateway partners, the University of Tasmania, CSIRO and the Australian Antarctic Division (AAD).

"This is an ambitious project which has built a world-leading, polar underwater vehicle equipped with new combinations of technologies to answer high-priority science questions," Antarctic Gateway Partnership Director, Prof. Richard Coleman, said. "The development process has built strong technical collaboration between AMC and the AUV manufacturer, International Submarine Engineering (ISE) of Canada. Proven concepts of underwater vehicle design and instrumentation were used, together with innovation in the integration of the operating systems and instrumentation."

AMC's strong background in maritime engineering, naval architecture and maritime training makes it ideally suited for such innovative vehicle development. This is bolstered through a strong partnership with the University's Institute for Marine and Antarctic Studies (IMAS), AAD and CSIRO in marine and Antarctic science.

Australian Maritime College Principal, Prof. Neil Bose, described the polar vehicle's arrival and facility opening as significant events which placed Tasmania firmly at the forefront of global AUV research and engineering.

"*nupiri muka* is the newest and one of the most capable AUVs in the world for use under sea ice and ice shelves. It will allow us to further build our global reputation for engineering in extreme environments, and help foster strong ties with the international research community," Prof. Bose said.

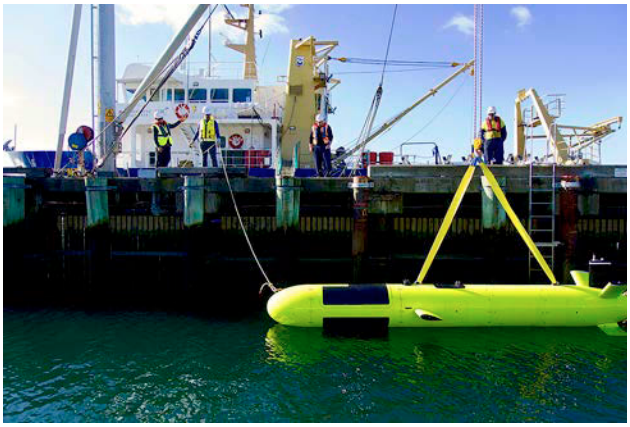
"Alongside our other vehicles and thanks to our strong engineering and research team, we are well placed to undertake a range of academic, national interest and industry-partnered projects."

AUVs are self-powered, untethered free-swimming robots which use propellers and control planes to travel through the ocean, near the seabed or underneath the ice. They are equipped with a range of sensors that gather information about the surrounding environment; for example, the shape and composition of the seabed and underneath the sea ice; the temperature, saltiness and chemical composition of the water; and the detection of geographical features and man-made structures.

AMC AUV facility coordinator, Peter King, said that the features of the polar underwater robot made it ideal for deployment in challenging, under-ice conditions.

"At nearly seven metres long and weighing one-and-a-half tonnes, *nupiri muka's* endurance enables it to travel more than 140 km, for 24 hours without needing to be recharged. It is also highly customisable, such that the engineering team can install a range of instruments in addition to those already on board," Mr King said.

"*nupiri muka* completed its first set of trials in Tasmania this past July. The vehicle performed according to plan, completing several successful dives in the North Tamar River. Subsequent longer and deeper trials are planned for coastal Tasmania over the next few months, with the goal of an Antarctic deployment in 2018–19."



Launching the AMC's new AUV
(Photo by Dr Damien Guihen, courtesy AMC)

Prize for Design Study on Large Catamarans

A study to determine optimum hull size for medium- to large-sized catamarans has won a leading international maritime research prize.

AMC Associate Lecturer, Dr Max Haase, and his team won the Medal of Distinction for best research paper through the Royal Institution of Naval Architects.

The study aimed to determine the lowest rate of fuel consumption for high-speed catamarans between 110 – 190 m in length, targeting speeds of 20 to 40 kn.

Dr Haase developed an innovative procedure to utilise computational fluid dynamics (CFD) for full-scale predictions, and embarked on the first hullform study of its kind to consider the full-scale version rather than model-scale types.

Dr Haase said that the challenge of the design study was to balance friction and wave-making drag on the hull.

"In the speed range we investigated, short hulls usually have a low frictional drag, but high-wave-making drag, while the opposite is true for very slender hulls," he said. We found a compromise in vessel length provided the lowest fuel consumption for a certain speed."

The study found that the lowest fuel consumption depends on speed and loading condition — the more load and the higher the speed, the longer the required hull to minimise fuel consumption. For light cargo and speeds below 26 kn, the optimal hull length is 130 m, while for heavy cargo and speeds up to 34 kn a hull of 170 m will result in the lowest fuel consumption.

Dr Haase said that international recognition was a great reward for the hard work over the course of his PhD and a practical example of the partnership possible between research institutions and the private sector.

"This has been a fantastic example of collaboration between academia and industry, where the innovative research techniques together with practical applications from industry partners provided groundbreaking outcomes."

He said that industry could use the results as design guidelines for large catamarans.

"The novel methodology developed can be used in future projects to predict the performance of a full-scale vessel without uncertainties arising from empirically extrapolating model-scale results as being application for full-scale vessels."

The paper was published in the RINA *International Journal of Maritime Engineering*.

CFD is a cost-effective way for organisations in sectors such as marine renewable energy, vessel design, offshore engineering and port development to optimise their designs and operations.

Dr Max Haase
(Photo courtesy AMC)

Neil Bose off to Canada

After 10 years at the Australian Maritime College, including over five years at the helm as Principal, Prof. Neil Bose is leaving to take up the role of Vice-President (Research) at Memorial University, Newfoundland and Labrador's university.

It represents somewhat of a homecoming for Prof. Bose, whose academic career included 20 years at Memorial University, a term he concluded as the Canada Research Chair in Offshore and Underwater Vehicles Design in 2007.

Prof. Bose arrived at AMC in May 2007 to manage the Australian Maritime Hydrodynamics Research Centre, before being appointed Director of the National Centre for Maritime Engineering and Hydrodynamics. He has led the College as Principal since January 2012.

University of Tasmania Provost, Prof. Mike Calford, said that Prof. Bose has had a profound impact during his time at AMC, lifting the profile and sharpening the focus of its research mission and wider academic contributions.

"Professor Bose leaves the organisation positioned as a centre of national excellence and of world standing in maritime engineering," he said.

"In recent years, he has been key to the development of new transformative partnerships which are critical to AMC providing leadership in maritime design, technology and research; with a strengthening focus on defence applications, polar research and marine resource management.

"The contribution of AMC to the Antarctic Gateway in collaboration with the Institute for Marine and Antarctic Sciences (IMAS), and other key partners, is another landmark project."

Prof. Neil Bose
(Photo courtesy AMC)

Prof. Bose's term has been marked by several key initiatives including:

- the commissioning of the AMC cavitation tunnel, the most advanced medium-sized cavitation tunnel in the world, which has attracted an increase of defence-related research,
- the initiation and expansion of AMC's Autonomous Underwater Vehicle capabilities, now recognised as being at the cutting edge nationally, and

- the ongoing upgrade and associated increase in commercial use of the College's maritime simulation facilities.

External relationships have been a key aspect of his time with the College, reflected in his role as Chair of the International Association of Maritime Universities.

An international search is being undertaken to find Prof. Bose's successor, who will be responsible for delivering the next phase of the AMC's future.

In the meantime, Prof. Nataliya Nikolova has been appointed Interim Principal commencing 30 October 2017 and will oversee further transformation of AMC's teaching programs.

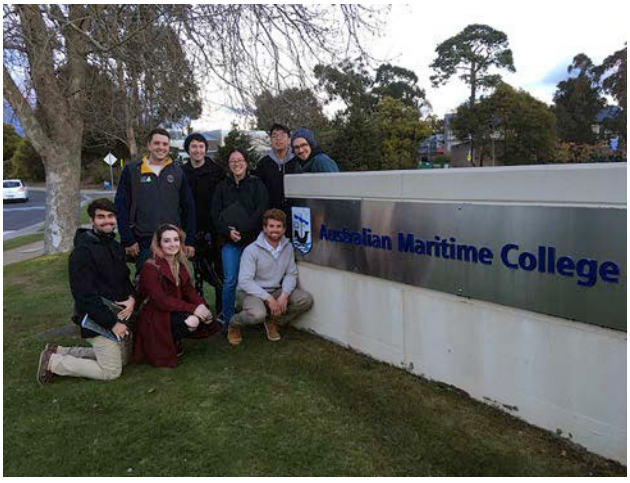
UNSW Sydney

Undergraduate News

Visit to AMC

On 7 and 8 September the Year 3 students studying Ship Hydrodynamics visited the Australian Maritime College accompanied by Dr Rozetta Payne. The visit was organised by Dr Tim Lilienthal, and UNSW is grateful for AMC's hospitality. The visit commenced with the students conducting resistance tests in the towing tank on the model of AMC's vessel *Bluefin* under Tim's supervision. This was followed by seakeeping tests on *Bluefin* in the towing tank. Next day the students were treated to a lecture on cavitation by Dr Bryce Pearce along with a demonstration of the cavitation tunnel, followed by a discussion on research at the AMC led by Dr Roberto Ojeda. The visit finished with a session in the ship-handling simulator with Damien Freeman.

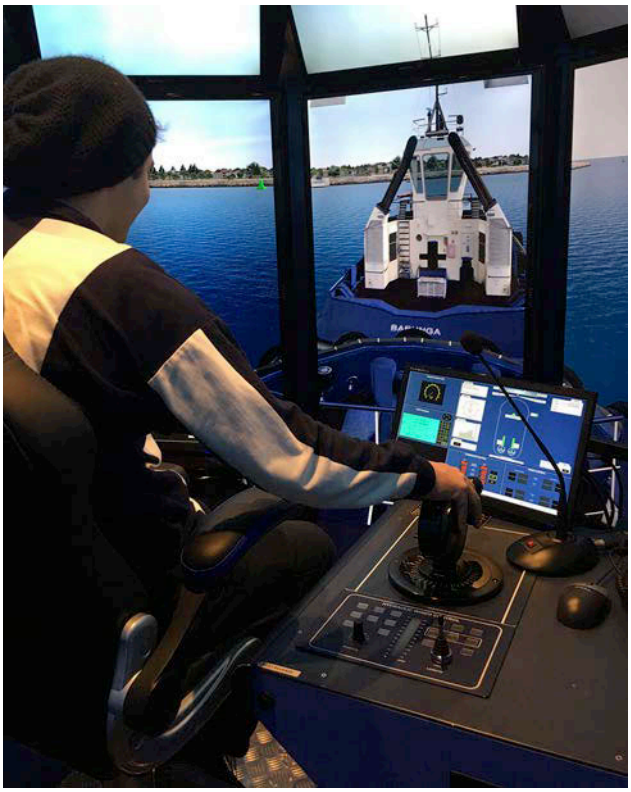
The students came away with a better understanding of ship model testing and how it is done in practice. It certainly helped to have naval architects talk about the various aspects of testing and research, and their explanations of the processes brought out the realities and practicalities which you don't get in the theory.



UNSW students at the Australian Maritime College
Back: Billy Gosper, Patrick McManus, Isabella Yan, Nelson Tsang, Patrick Doherty
Front: Gianluca Viluce, Tamasin Welch, Edward Hawkins
(Photo courtesy Rozetta Payne)

UNSW students on the towing-tank carriage at the AMC
(L to R) Edward Hawkins, Isabell Yan, Patrick McManus, Billy Gosper, Patrick Doherty, Gianluca Voluce, Nelson Tsang, Isabella Yan
(Photo courtesy Rozetta Payne)

Bluefin model at a speed corresponding to 14 kn in the towing tank
(Photo courtesy AMC)



Captain Patrick McManus at the tug controls in the ship simulator
(Photo courtesy Rozetta Payne)

Thesis Topics

Among the interesting undergraduate thesis projects newly under way is the following:

Numerical Prediction of the Wave Wake of a Foilborne Surface-piercing Hydrofoil

Wave wake from vessels has the potential to provide hazards, such as erosion of river banks, damage to moored craft, etc. As a result, some areas in which high-speed passenger craft are intended to be operated have strict limitations on the maximum wave wake permitted to be generated.

Mohammad Alimardani has commenced a project to assess whether a CFD model is able to reliably predict the wave field generated by a hydrofoil craft. If successful, this research could provide hydrofoil designers with an accurate methodology in assessing the compliance of their craft for routes at a relatively early design stage including examining alternative configurations and speeds.

The forward and aft foils on a Rodriquez RHS 140 hydrofoil have been modelled, and a deep-water analysis of each foil separately has been conducted. The next phase will bring the foils to the surface-piercing condition (as when the hull is foil-borne) and then bring the two foils into operation together. Results will be compared to experimental measurements made previously.

Thesis A Conference

The following Thesis A progress presentations on naval architecture student projects were made on 31 October:

Mohammad Alimardani	*Numerical Prediction of the Wave Wake of a Foilborne Surface-piercing Hydrofoil*
Paul Darmanin	*An Investigation of Ventilating Hydrofoils on the Nacra 17 Olympic-class Catamaran*

Thesis B Conference

The School's undergraduate Thesis B Conference for Semester 2 took place on 30 and 31 October. The following presentations on naval architecture student projects were made on 31 October:

Jiong Wang	*Finite-element Modelling and Direct Strength Analysis of Bulk Carriers*
Angus Bratter	*Longitudinal Radius of Gyration of Ships*
Brett Ryall	*Investigation of Historic Vessel TSS* Merimbula
Gian Ferrighi	*Analysis and Optimisation of Current International Moth Foil Design through CFD*
Stefano Ferrighi	*Development and Optimisation of a Soft Wing Sail*
Andy Green	*Validation of the ORC Velocity-prediction Program with Recorded Data for High-performance Yachts*

RINA–DST Group Award

RINA and DST Group jointly offered an award and certificate for the best presentation by a student member on a naval architectural project at the Thesis B Conference. Assessment was made on the basis of marks awarded by School staff. The award went to Angus Bratter for his presentation on *Longitudinal Radius of Gyration of Ships*. The award and certificate are in train.

Graduation Ceremony

At the graduation ceremony on 9 November, the following graduated with degrees in naval architecture:

AdelaGreenbaum	
JamesJohnston	Honours Class 1
Geoffrey McCarey	Honours Class 1

Graduates Employed

They are now employed as follows:

Adela Greenbaum	NSW Roads and Maritime Services, Sydney
James Johnston	ASO Marine Consultants, Sydney
Geoffrey McCarey	Travelling in Europe and the USA

Congratulations, all!

(L to R) Adela Greenbaum, Phil Helmore, Geoffrey McCarey and James Johnston at the UNSW Graduation Ceremony on 9 November
(Photo courtesy Pearl Rozenberg)

Naval Architects' Annual Dinner

With the passing into history of the Thesis Conference Dinner, the sixth Naval Architects' Annual Dinner was held on 9 November at Giovanna Italian Restaurant in Kingsford, and was attended by most of the final-year naval architects, along with staff Lawry Doctors, Mac Chowdhury and Phil Helmore.

Phil Helmore

Naval architects enjoying their Annual Dinner
(L to R) Phil Helmore, Andy Green, Yun Wang, Gian Ferrighi, Stefano Ferrighi, Cameron Edwards, Mac Chowdhury and Lawry Doctors
(Photo courtesy Giovanna Italian Restaurant)

Curtin University

Containership Squat and Wave-induced Motions

Curtin PhD student, Scott Ha, has now completed a comprehensive analysis of the 2016 containership trials in Fremantle which were carried out with his PhD supervisor, Dr Tim Gourlay. Scott has compared measured squat and wave-induced motions with numerical predictions using SlenderFlow and Octopus software. A journal article on the topic has recently been accepted for the Journal *of Waterway, Port, Coastal and Ocean Engineering*. In addition, the full results will be published in Scott's PhD thesis, which he expects to submit in February 2018.

Fremantle containership trials
(Photo courtesy Tim Gourlay)

WA Subs in Schools Technology Challenge

The Western Australian State Final for the *Subs in Schools Technology Challenge* was held on 19 October 2017. Subs in Schools is coordinated by Re-Engineering Australia and runs in the same way as F1 in Schools. The program aims to encourage students to pursue Science, Technology, Engineering and Mathematics (STEM) learning, careers and skills. The program is supported by industry and education partners who provide mentoring for the competing teams and judges for the competition.

The program is divided in to four levels:

- Level 1 Build a mini ROV
- Level 2 Design and build an ROV
- Level 3 Design a submarine internal accommodation space
- Level 4 Design and build a working model submarine

The student teams are scored on a verbal presentation, marketing, their design process, use of computer-aided design, manufacturing, compliance with the specification, and their performance in a sea trial. The sea trial involves navigating the vessel through a course and, in the ROV category, object retrieval and taking video footage.

At the Western Australian State Final, Level 1, 2 and 4 projects were presented. Only Level 2 projects were scored, as the Level 4 projects go straight through to the national final and the Level 1 projects are intended as an introduction and are not judged competitively.

The top placings teams for Level 2, Design and Build an ROV, were:

1 The Kraken (South Fremantle SHS)
2 Alia Astra (Comet Bay College)
3 North Lake Tridents (North Lake SHS)

The national final will be held in Western Australia on 22 November.

More information about the Subs in Schools program can be found at https://rea.org.au/subs-in-schools/

Tim Gourlay

INDUSTRY NEWS

Lendlease Selected to Build Osborne South Shipyard

On 12 October the Government announced that Lendlease had been selected as the managing contractor for the construction of the Osborne South Shipyard.

Following a competitive tender process, Lendlease, in partnership with Australian Naval Infrastructure Pty Ltd, will be responsible for undertaking this project. Lendlease has a proven track record with large high-profile construction projects and has recently delivered major projects in South Australia, including the Adelaide Oval and Convention Centre redevelopments.

Mobilisation works commenced in October and the new shipbuilding infrastructure is expected to be ready to support the commencement of construction of the RAN's new frigates at the site in 2020.

The Minister for Defence Industry, the Hon. Christopher Pyne MP, said that South Australians were now seeing the tangible benefits of the Government's historic $90 billion naval shipbuilding program.

"For the first time in over a decade we are seeing jobs created at Osborne, with up to 600 construction-related jobs to be created on the Osborne South Shipyard project," Minister Pyne said.

The Minister for Finance, Senator the Hon. Mathias Cormann, said that the Government's decisions to establish Australian Naval Infrastructure Pty Ltd and purchase land and facilities from the South Australian Government have enabled work to progress rapidly.

Radar Upgrade for Anzac-class Frigates

Australian company CEA Technologies has won a contract to upgrade the capabilities of the Royal Australian Navy's Anzac-class frigates.

The Minister for Defence Industry, the Hon. Christopher Pyne MP, said that the contract, valued at $148 million, would see the production of new air-search radar, known as the CEAFAR2-L, for the Anzac-class frigates. The contract is part of the larger program which will modify the ships and integrate the radars that has a total value of over $400 million.

"The air-search radar upgrade will ensure that Defence is able to adapt to modern and evolving air and missile threats and maintain a capability edge for the life of the Anzac class," Minister Pyne said.

"The radar has been developed by CEA Technologies in Canberra, a company which employs almost 400 staff, whose technology is leading the world and being adopted by armed forces across the globe.

"The air-search radar represents a leading-edge technology innovation and reflects a positive and effective ongoing collaboration between Defence and CEA Technologies over the last 15 years.

"CEA Technologies will build on the technology developed for the Anzac-class frigates to develop the next-generation of air-search radars for the future frigates.

"In addition to CEA, the wider Australian industry will play a vital role in installing and sustaining the air-search radar, particularly in providing local employment opportunities in Fremantle, Western Australia, with flow-on benefits for the local economy," he said.

An impression of the new Osborne South Shipyard to be built in Adelaide by Lendlease for the construction of the RAN's furure frigates
(Image courtesy Department fo Defence)

UK Considers CEA Radar for RN

During her visit to Adelaide on 10 November, the British Under Secretary of State for Defence Procurement, Harriet Baldwin, announced a capability study to fit CEA Technologies' CEAFAR radar to British ships which will begin early next year. The radar is already in service with the Royal Australian Navy.

The decision came after the Australia/UK Defence Industry Dialogue which took place in the United Kingdom recently. The partnership is seen as a vehicle for accelerating co-operation between the two nations.

The Minister for Defence Industry, the Hon. Christopher Pyne MP, said that the announcement was an important follow-up to last week's dialogue and showed the continuing strengthening of defence industry ties between the two countries.

"Australia and the United Kingdom have much that can be gained from increasing cooperation around defence industry," Mr Pyne said. "A great outcome of last week's dialogue is the possibility of the cutting-edge Australian CEA radars being used for the future UK warships.

"Canberra's CEA Technologies designs and manufactures advanced phased-array radars for our Navy's eight Anzac-class frigates as part of their Anti-Ship Missile Defence Upgrade Program and the recently-announced Long Range Air Search Radar replacement.

"The Government has also mandated that Australia's future frigates will have a CEA radar as one of its core capabilities.

"I'm excited by the possibility of sharing this great capability with one of our closest and oldest allies and the landmark export opportunity which this presents for Australia's burgeoning defence industry," he said.

Austal Opens Adelaide Office

On 1 September Austal Australia celebrated the opening of its Adelaide office, which is intended to support design and production for the RAN's $3 billion Offshore Patrol Vessel (OPV) program.

Officially welcoming Austal's expansion into Adelaide were Martin Hamilton-Smith, Minister for Defence Industry (SA), Senator David Fawcett, and several locally-based small-to-medium enterprises which are already a part of Austal's 1000 plus Australian supply chain.

"As Australia's largest defence exporter, it is only natural for us to have a presence in Australia's largest naval shipbuilding hub," Austal's Chief Executive Officer, David Singleton, said.

"We are increasing our presence in Adelaide to contribute to the Government's sovereign shipbuilding commitment, something which will see Australia able to design, build and export a whole range of naval vessels," Mr Singleton said.

"As the only Australian shipbuilder to export defence vessels, we are committed to ensuring that the Naval Shipbuilding Plan is achievable" he said.

"Our collaboration with our design partner, Fassmer, for the OPV project is not only about building for the Royal Australian Navy, but to export the vessel around the world.

(L to R): Thomas Sass (Fassmer), the Hon. Martin Hamilton-Smith — Minister for Defence Industry (SA), David Ridgeway MLC — Leader of the Opposition in the Legislative Council, Vickie Chapman — Deputy Leader of the Opposition, David Singleton (Austal), Senator David Fawcett, and Senator Alex Gallagher (Photo courtesy Austal)

"Of the three bidders for the OPV program, AustalFassmer is the only one with both a track record of exports from Australia and concrete plans to sell internationally. Actions speak louder than words.

"Our joint venture will deliver a complete transfer of intellectual property to Australia relating to the OPV 80 design, a process which will be initiated in Adelaide.

"This will not only deliver jobs, but crucial skills and know-how to Australian shipbuilding," Mr Singleton said.

Although the AustalFassmer Adelaide office has been established to primarily support the OPV program, there will also be ongoing work from Austal Adelaide to support the Austal/ASC Frigate teaming agreement.

Austal Alliance with Incat Crowther

On 5 October Austal signed an agreement with Incat Crowther, establishing a formal strategic alliance to pursue commercial vessel opportunities in Australia and overseas.

The alliance formalises an already-successful relationship which has seen five commercial vessels constructed for four operators worldwide since 2015, and another vessel which is currently under construction by Austal.

Austal is the world's largest aluminium shipbuilder and Australia's biggest defence exporter, having built, or is in the process of building, more than 300 vessels for 100 customers in 44 countries. Incat Crowther is an Export Award-winning Australian-based naval architecture firm established in 2005. Over 450 vessels built to the company's designs are operating in more than 20 countries worldwide.

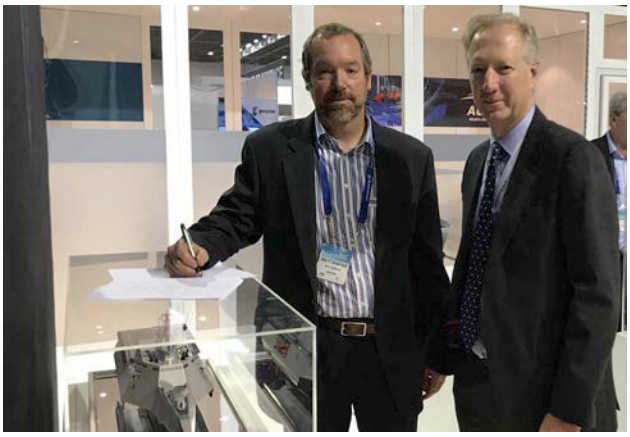
Meeting at Pacific 2017 in Sydney to sign the agreement, Austal's Chief Executive Officer, David Singleton, and Incat Crowther's Managing Director, Brett Crowther, spoke about the companies' successful collaboration and contribution to Australia's sovereign shipbuilding industry.

"Between Austal and Incat Crowther, Australia leads the international market in high-speed aluminium vessels" David Singleton said.

"With complementary capabilities in vessel design and construction, our collaboration further supports Australia's competiveness in the international market. Austal believes that formalising this relationship can deliver more vessels

for construction into our shipyards," Mr Singleton said.

Austal Australia and Incat Crowther will work together to pursue projects that include Large Crew Transfer Vessels (LCTVs) servicing offshore installations, high-speed passenger ferries and other passenger-only National Standard for Commercial Vessels (NSCV) craft in Australia and overseas markets, excluding the USA and mainland China.



Austal CEO David Singleton with Incat Crowther Managing Director Brett Crowther announcing the companies' strategic alliance at PACIFIC 2017 in Sydney
(Photo courtesy Austal)

Australian Maritime Technologies Returns after tkMSA Buyout

The management of thyssenkrupp Marine Systems Australia (tkMSA) announced that it completed the buyout of the business from its parent company.

On 1 September, ownership of thyssenkrupp Marine Systems Australia transferred to its management team who renamed the company to Australian Maritime Technologies Pty Ltd (AMT), returning to the name by which the company was previously known in the Australian defense industry.

AMT was formed 30 years ago to provide a home for technology transferred to Australia as part of the Anzac-class frigate project. Since then, AMT has continuously provided naval ship design and related engineering and project management services in Australia and internationally.

After the sale of thyssenkrupp Marine Systems Australia, German defense contractor Thyssenkrupp will continue its Australia presence through its Australian subsidiary Sonartech Atlas into which it has now integrated its spare parts services business.

Naval Group opens Australian Office

Naval Group has marked the official opening of its new Australian headquarters with the commencement of master planning studies to inform the design and construction of the future submarine construction yard in Adelaide.

The new Naval Group office at Richmond Road in Keswick, Adelaide, was officially opened on 30 August by the Hon. Christopher Pyne MP, Minister for Defence Industry, and Herve Guillou, Global Chairman and Chief Executive Officer, Naval Group.

During the opening ceremony, Naval Group announced that it has engaged Coffey Services Australia, Alexander Symonds and Precision Hydrographic Services to commence survey work in preparation for the design and construction of the future submarine construction yard in Adelaide.

Herve Guillou heralded the opening and the commencement of survey work as another milestone achievement in Australia's Future Submarine Program.

"To inform the design of the construction yard in Adelaide, where Australia's fleet of regionally-superior future submarines will be built, we will be commencing comprehensive survey work in the Osborne precinct. We look forward to working with the Australian companies who will provide us with these services," Mr Guillou added.

Mr Guillou said that opening of the new office was a demonstration of the firm's commitment to delivering Australia 12 regionally-superior submarines, by bringing international experience and technology together with local capabilities, to upskill Australian industry and help Australia become a sovereign submarine nation.

Naval Group's Adelaide headquarters is currently home to 40 staff, a mix of French personnel and Australians, who are working on the early phases of the Future Submarine Program including submarine design, supplier engagement and infrastructure planning for the new submarine shipyard.

Local Businesses Approved For Submarine Supply Chain

Naval Group Australia has confirmed that, by 30 August, 126 local businesses have been pre-qualified as eligible to take part in the supply chain for the $50 billion Future Submarine Program.

Over the last twelve months, these businesses have been thoroughly assessed and deemed as capable of delivering the quality products, parts or services needed to deliver this vital project.

Canadian BWMS for Australia's Antarctic Research Vessel

Australia's future Antarctic Supply and Research Vessel (ASRV) will be fitted with a custom-designed ballast water management system (BWMS).

Damen Green Solutions has designed a solution which uses the Trojan Marinex BWT 250 to meet the exacting requirements of Damen Schelde Naval Shipbuilding (DSNS).

The ASRV's ballast water management system has to provide specific operational capabilities including the ability to operate effectively in very cold waters, to use no chemicals, to generate no by-products and to be as compact as possible, given that space is at a premium on this complex vessel.

Following an assessment of all the available options, Damen Green Solutions recommended the Trojan Marinex BWT 250, manufactured by Trojan Technologies of Ontario, Canada.

"At Damen Green Solutions, we partnered with Trojan Marinex to design a 'plug-and-play' installation for DSNS," said Stefhan van Esch, Design and Proposal engineer at Damen. "Together we created a bespoke design which mounts the entire BWMS on a 3 m × 1 m skid which can

be easily and quickly fitted into the available footprint in the engine room. Prior to leaving the manufacturing works it will undergo a factory acceptance test, leaving DSNS with the simple matter of connecting up the power and the main pipes once it is aboard the ASRV. The Trojan Marinex BWT 250 will then be ready to disinfect and treat up to 250 m³/h of seawater."

Canadian Resolve-class Replenishment Ship *Asterix* Afloat

Canadian shipbuilder Davie Shipbuilding recently launched the Royal Canadian Navy's Project Resolve replenishment ship (AOR) *Asterix* at its shipyard in Quebec.

The naval support ship started life as containership MV *Asterix* and was converted into a replenishment ship after arriving in Lévis in October 2015.

The shipbuilder said that commissioning of all onboard systems began in early September and the ship was expected to start its sea trials on 16 November 2017, prior to achieving full operational capability.

Over 900 Canadian companies contributed to the conversion of the ship, including the supply of key military-specified equipment such as its Integrated Navigational and Tactical System (INTS), its NATO-compliant Replenishment-At-Sea (RAS) systems and its naval Integrated Platform Management System (IPMS), Davie Shipbuilding said.

Alex Vicefield, Chairman of Davie Shipbuilding, commented "The delivery of this ship has clearly demonstrated that there is a Canadian shipyard capable of delivering complex naval platforms on time, to budget and at internationally-competitive prices. In the knowledge that the Royal Canadian Navy needed this ship urgently, our 1400 staff have worked day and night to ensure that it is not only delivered on time but that it is of a quality that will be able to serve Canada proudly for decades to come."

Asterix is 182.5 m long and is capable of transporting up to 7000 t of fuel at speeds of up to 25 kn.

It features two cranes allowing the loading and unloading of containers which are accessible at sea, a helicopter deck, two hangars for helicopters, a hospital able to accommodate 60 patients and galleys able to feed 1000 people.

The ship has been privately financed by Davie and will be leased to the Canadian Government while Federal Fleet Services, a Davie sister company, will operate the ship with a mixed crew of merchant seafarers and Royal Canadian Navy personnel.

New Approach to Naval Combat Systems

At Pacific 2017 on 3 October the Prime Minister, Malcolm Turnbull, announced a new approach for combat-management systems for future RAN warships.

Under the plan, the combat management system for Australia's fleet of nine future frigates will be the Aegis combat management system, together with an Australian tactical interface, which will be developed by SAAB Australia.

This decision will maximise the future frigate's air-warfare capabilities, enabling these ships to engage threat missiles at long range.

The future frigates are expected to be operating in a complex and growing threat environment. By bringing together the proven Aegis system with a cutting-edge Australian tactical interface developed by SAAB Australia, the future frigates will have the best capability for defeating future threats above and below the surface, while also ensuring that Australia maintains sovereign control of key technologies, such as the Australian designed-and-built CEA phased-array radar.

In the past, Defence has selected combat management systems individually, which has meant that the Navy has operated numerous systems at the same time. This has not

The Canadian replenishment ship *Asterix*
(Photo courtesy Davie Shipbuilding)

allowed defence industry to strategically invest for the long-term and has also increased the cost of training, maintenance and repair.

The Government has now mandated that, where the high-end warfighting capabilities of the Aegis system are not required, a SAAB Australia-developed combat-management system will be used on all of Australia's future ship projects.

This includes mandating a SAAB Australia combat-management system on the upcoming offshore patrol vessels, which will be built in Australia from 2018, and an Australian tactical interface developed by SAAB Australia for the Hobart-class guided missile destroyers when their Aegis combat-management system is upgraded in the future.

SAAB to Create 150 New Jobs in SA

On 7 October SAAB Australia stated that the decision to award it the contract to build the tactical interface for the new future frigates and the combat management system for future non-combat vessels will create approximately 150 new jobs.

Possible Merger of Naval Group and Fincantieri

By June 2018 French and Italian shipbuilding giants Naval Group and Fincantieri are to define "a roadmap detailing the principles of the future alliance".

The announcement of the possible merger was made on 27 September in Lyon, France, by French president, Emmanuel Macron, and Italian prime minister, Paolo Gentiloni.

In a joint statement the two companies welcomed the announcement. "Our two groups have already successfully cooperated on the Horizon and FREMM frigates programs and we look forward to achieving together our European ambition, while serving our international development in a growing and competitive naval defence market and continuing to support the Italian and French navies," Naval Group Chief Executive, Hervé Guillou, and Fincantieri Chief Executive, Giuseppe Bono, said.

In addition to the possible merger, it was also announced that Fincatieri would be taking a 50% stake in the French STX shipyard in Saint Nazaire.

GE signs MoU with RJE Global for RAN Turbine Assembly

Gas turbines for the Royal Australian Navy's Future Frigate program could be built by Australian RJE Global under a Memorandum of Understanding (MOU) signed with GE's Marine Solutions.

GE's Marine Solutions said in an announcement on 27 September that RJE would assemble GE LM2500 gas turbine modules and manufacture a number of components for these engines. The MOU was signed by both companies recently at RJE's facility in Adelaide.

The nine-ship SEA 5000 Future Frigate Program will replace the Anzac-class frigates. GE's LM2500 gas turbines are operational on two of the short-listed qualified ship designs: Fincantieri's FREMM and Navantia's F100.

"Through this MOU, GE provides RJE access to manufacturing and assembly knowledge as well as other GE resources which have been used with similar local manufacturers globally to produce our reliable LM2500 marine gas turbine modules," said Brien Bolsinger, Vice President and General Manager, GE.

RJE designs and builds plant and power solutions for industries including mining, renewable energy, utility power generation, and infrastructure. RJE already is an authorised distributor for GE Transportation's medium-speed diesel generator sets both in Australia and internationally. RJE also performs work on GE Power's LM2500 trailer mounted gas turbine power-generation modules.

"As a result of this MOU, we recently met face-to-face with the GE team and some of their key suppliers in Cincinnati where we shared information and aligned capabilities to ensure quality fabrication and assembly for GE's LM2500 marine gas turbine modules," RJE's managing director Robin Johnson said.

Data Analytics Collaboration to Improve Naval Capability

The Royal Australian Navy will use an innovative new data analytics system to improve fleet efficiency and capability as part of a new collaboration with GE and CSIRO's Data61.

The Minister for Defence, Senator the Hon Marise Payne, said the GE LM2500 gas turbines which power the Adelaide- and Anzac-class frigates will be fitted with new sensors and coupled with advanced algorithms which will improve operational effectiveness and reduce operating costs.

"The collaboration between Defence, GE and Data61 would see the collection and analysis of gas turbine data to better understand the stresses placed on engines at sea," Minister Payne said.

"This will enable Defence, with real-time information, to better identify and prevent issues before they occur, thereby reducing maintenance periods and ensuring that our frigates are available to spend more time at sea. Increasing engine performance and reducing fuel burn will also lead to greater operational efficiency."

"The information gained through this innovative data-sharing initiative could lead to increased operational effectiveness and readiness, as well as a reduction in the through-life cost for the systems."

"This is another example of Defence working collaboratively with industry to develop world-leading technology and deepen the relationships that create mutually beneficial outcomes," Minister Payne said.

The existing contract for GE LM2500 gas turbine maintenance and logistic support was recently extended to include the Canberra-class landing helicopter dock ships (LHDs), with the Hobart-class guided missile destroyers also expected to be included in the future.

Sustaining the Capability Superiority of the Collins-class Submarines

On 4 October, the Minister for Defence, Senator the Hon. Marise Payne, and the Minister for Defence Industry, the Hon. Christopher Pyne MP, announced two projects to sustain the capability superiority of the Collins-class submarines fleet until their replacement by the future submarine.

The first project addresses obsolescence in the control system

to allow safe operation of the submarines, while the second provides improved submarine communications capability.

Minister Pyne said that the involvement of Australian defence industry, as part of Australia's submarine enterprise, is fundamental to our ability to manage and sustain a multi-class submarine fleet.

"On average, 120 people per year across New South Wales, South Australia and Western Australia will be employed over the life of the program," Minister Pyne said. "Combined, the projects will inject approximately $540 million into the Australian economy over the next 20 years, with $300 million going into South Australia, $65 million to New South Wales, and $175 million to Western Australia."

While ASC will manage the integration of the updated systems, Defence has engaged SAAB Australia to update the control system.

The expertise and experience of Raytheon Australia, in the role of Collins-class combat-systems integrator, will be leveraged to coordinate the communications upgrade.

The Government also announced that the Collins-class submarine sustainment project has been officially removed from the Projects of Concern list. This project was added to the list in November 2008, but given the extraordinary effort which has been put into rectifying the issues associated with the submarines, and given that submarine availability is now meeting international benchmarks, the Government is confident that the project can be removed from the list.

Wärtsilä Ultra-silent Propulsion for Research Vessel

It was announced on 31 October that Wärtsilä will supply an ultra-silent propulsion package for a new research vessel to be built for the Faroe Islands Marine Research Institute, a Faroese Government organisation. The solution is made possible through Wärtsilä's in-house competences in silent diesel generator sets, propeller shaftlines, and electrical and automation (E&A) systems. The vessel is being built at the MEST shipyard in the Faroes. The order with Wärtsilä was placed in June 2017.

The ability to create a propulsion solution which significantly limits underwater radiated noise (URN) and which meets the DNV Silent R notation, was a key factor in the award of this contract to Wärtsilä. By enabling the vessel to sail with very little URN, the Wärtsilä solution will facilitate the ability of the research personnel onboard to carry out their tasks with greater effectiveness.

"It is a reflection on Wärtsilä's extensive resources in both equipment and in-house technical know-how that we are able to meet the customer's need for an ultra-silent vessel. This broad range of competences enables us to serve our customers better, and gives Wärtsilä a distinct competitive edge," said Simon Riddle, General Manager, Naval and Research Vessels, Wärtsilä Marine Solutions

"Having a single supplier capable of providing everything specified for this modern research vessel's performance requirements is, of course, extremely helpful. It saves procurement time and reduces the project scheduling risks, so we are very grateful for Wärtsilä's cooperation and support," said Mouritz Mohr, CEO, MEST Shipyard.

The 54 m long ship will be powered by two 8-cylinder Wärtsilä 20 engines and will have a silent Wärtsilä fixed-pitch propeller and complete shaft line. The solution is very compact, which results in reduced acoustic signals. Wärtsilä will also supply a selective catalytic reduction (SCR) system to clean the engine exhaust of nitrogen oxide (NOx) emissions.

The new research vessel which will feature an ultra-silent propulsion system from Wärtsilä
(Image courtesy Wärtsilä)

THE INTERNET

RINA Australian Division Technical Library

Members should be aware of the Australian Division's Technical Library which is available online, and some of the interesting information contained therein. The Technical Library contains PDF copies of the papers presented to the Australian Division between 1955 and 1996, with some from Ausmarine 2000 included for good measure.

To find the Technical Library, go to the RINA Australian Division's website at www.rina.org.uk/australia.html. Under the Australian Division Links on the right-hand side, click on Technical Library. Then click on Click Here for Index and Papers.

You will be presented with icons for Index and Papers. Index is where you find the filename of the paper you are after, and then you go to Papers to retrieve the PDF copy.

Click on the Index icon. This brings up two icons, one for papers sorted by author's family name in alphabetical order, and one sorted by date in numerical order from 1955 to 1996. Click on either one and browse away to your heart's content.

When you find a paper that you are interested in, make a note of the filename which is listed in the Number column on the left-hand side. Click the Back button on your browser, twice, to return to the Index/Papers icons page. Click on the Papers icon. The paper filenames are in date order, so scroll down until you find the filename of the paper you are looking for, click on it, and the PDF copy will be downloaded.

Happy reading!

Phil Helmore

THE PROFESSION

A Case Study of a Standard NSCV Revision Project

Rob Maher
Principal Naval Architect, AMSA Vessel Safety Unit

Introduction

Among the first parts of the National Standard for Commercial Vessels (NSCV) which were published, in April 2005, the Part C Section 4 Fire Safety turned out to be a complicated document. The new structure, while well intended, complicated the standard, which many users found confusing. The need to look in multiple places in order to determine a requirement made for a time-consuming and testing task. Along with the new document structure, the range of vessels covered by NSCV Part C4, when compared on the international stage, is broad for a single standard, adding to the complication.

Background

While most NSCV sections published around 2005 adopted their content and approach from the Uniform Shipping Laws Code (USL Code), a decision was made with the fire safety section to adopt a new, risk-based approach. The resulting standard shifted the fire safety focus from control measures based on vessel class and length, to vessel and space risks.

- Vessels were categorised into four fire-risk categories, based on their:
  - use;
  - operational area;
  - numbers of occupants; and
  - nature of occupation (day or overnight).
- Spaces on board vessels were further categorised based on fire-source potential; e.g. the size of machinery within a space.

The standard was then split into sections which provided general requirements for passive and active fire protection, in Chapters 3 and 4, with specific requirements for each type of space contained in Chapters 6–11. Chapters 12, 13 and the annexes completed the picture by adding the performance and servicing requirements.

The relationships between chapters and numerous circular references in the document meant that quick referencing for a requirement was difficult.

Review

An independent review of Part C Section 4 was commissioned by AMSA in September 2014.

The review examined regulatory approaches to fire safety by regulators in the UK, USA, Canada and the European Union. It found that each of these international regulators used multiple standards to cover the same scope as the NSCV. They used an average of five separate standards to cover the same scope as NSCV Part C4.

The review then continued with a detailed examination of two standards selected from the UK framework, highlighted in Figure 1.

The UK standards reviewed in detail were the *Safety Code for Passenger Ships Operating Solely in UK Categorised Waters* (MSN 823) and the *Code of Practice for the Safety of Small Workboats and Pilot Boats* (Brown code).

ISO 9094 was also reviewed as a potential standard for Class 4 vessels.

The review found that:

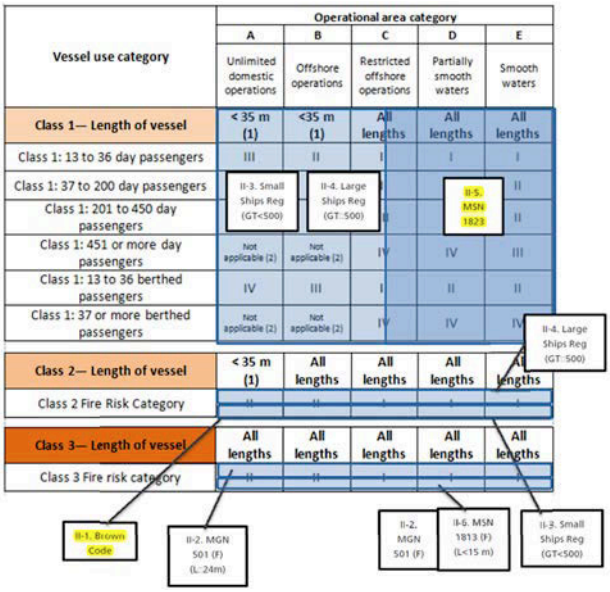


Figure 1 UK framework overlayed with C4 fire risk categories (Image courtesy AMSA)

- For fire risk Category I, the NSCV has similar or slightly lower safety outcomes than MSN 1823 and the Brown Code.
- For fire risk Category II, the NSCV has similar outcomes to MSN 1823 and slightly higher safety outcomes than the Brown code.
- For fire risk Categories III and IV, the NSCV has higher safety outcomes than MSN 1823.

The areas where NSCV requirements exceeded these codes generally related to passive fire-protection measures, such as the use of fire-restricting materials (both inside and outside high-risk areas) and, hence, the fire load of the individual spaces, together with the amount of smoke and toxic gases that could potentially be generated in the event of a fire.

Outcomes

Several recommendations were made in the subsequent report to revise and improve the NSCV Part C4 standard. AMSA has taken the following actions to implement these recommendations:

1. The F2 leisure craft standard has been amended and came into force in April 2017.

   The changes in this standard permit Class 4 vessels to apply a combination of ISO 9094 and AS 1799.1 for fire safety. These standards are more closely aligned with the recreational operational risk profile of hire-and-drive vessels.

2. *Marine Order 503 (Certificates of Survey)* is being amended.

   Of relevance to fire standards, these changes relate to how standards are applied to grandfathered vessels.

   Retrospective application of the passive fire-control requirements can be impractical. For example, it can be difficult to determine whether a paint or fit-out material contains nitro-cellulose and complies with the building code or *International Code for Application of Fire Test Procedures* (2010 FTP code). Similarly, retro-fitting of structural fire protection can be difficult and ineffective without removal of the ancillary systems within spaces.

   The proposed changes to *Marine Order 503* provide that, where a vessel is modified or changes operations and, as a result, the fire-risk category of the vessel does not change, then continued compliance with the USL Code will be accepted. The exception is that an NSCV-compliant fixed fire detection and extinguishing system must be fitted, if required by Part C4 criteria.

   These changes recognise that there is a positive safety outcome by permitting older vessels to be updated and refreshed, without requiring full compliance with current standards. The provisions ensure that all vessels are fitted with fixed fire systems, in accordance with the latest standards where required, and begin to transition to the newer standards. However, the regulatory barrier to modification is not so high that operators choose to forgo investment in their vessels and operations.

3. NSCV Part C4 has been re-drafted and amended.

   The section has been restructured so that requirements common to multiple space types, e.g. requirements for fire extinguishers, are consolidated into a single location. These parts are now able to be directly referenced, rather than having to refer back and forth between the space chapters and the active fire-protection chapter.

   This modification to the structure has removed duplicated content and circular references from the standard, resulting in a standard which achieves the same outcomes, but is shorter. The resultant standard is 86 pages, down from 150.

   The wording of ambiguous clauses has been modified to make them easily understood and technical changes have been made to eliminate discrepancies identified in the independent technical review and received through industry feedback.

Key Technical Changes

The key technical changes made in the new NSCV Part C4 are:

- raising of the structural fire protection exception on Class 2C and 3C vessels for fire risk Category I vessels without accommodation for berthed persons from 12.5 to 24 m;
- removal of the requirement to test fire dampers, provided that they are made from steel of thickness of at least 3 mm;
- clarification of the requirements to test ducts and duct penetrations;
- minor changes to the pipe-penetration requirements and clarification that plastic pipes may be used in fire risk spaces if they are fire endurance tested (IMO Res A.753(18)) or are used in non-essential systems which have type-approved penetrations (generally crusher type);
- removal of the requirement for hinged steel or equivalent watertight doors fitted in watertight bulkheads to be type-assessed;
- addition of AS 14520, ISO 15579 and AS 4487 to the list of standards acceptable for fixed fire-extinguishing systems;
- clarification that low-expansion foam fixed fire systems are acceptable if tested to the *International Code for Fire Safety Systems* (FSS Code) Chapter 6;
- addition of a power allowing AMSA to determine new standards for fixed firefighting systems without having to amend the standard;
- removal of the requirement to fit drip trays under free-standing tanks of fire risk Categories I and II vessels; and
- clarification regarding the requirement for remote shutoffs to be capable of operating when exposed to flame or heat.

Review of the Draft Part C4 Standard

Following re-draft and prior to public consultation, the draft was reviewed as part of a cooperative arrangement with the Australian Maritime College.

The review applied both the new draft standard and existing published standard to six vessel designs of varied use, ranging from 11 to 102 m in length. The outcomes were recorded and discrepancies highlighted for AMSA's consideration.

The review concluded that the outcomes of the revised simplified standard were generally consistent with the previous version.

Where differences were identified, these were corrected or confirmed as being intentional.

External consultation

The draft was then opened for external consultation during July and August 2017, with industry being advised via AMSA e-News, Facebook and email. AMSA has incorporated feedback received during this consultation into the standard.

The new NSCV Part C4 is in the final stages and will come into force in the coming months.

Conclusion

The National Standard for Commercial Vessels Part C Section 4 Fire Safety has been revised, following comments received from industry. The re-drafted standard gives outcomes similar to the original document, but is expected to be easier to use.

MEMBERSHIP

Australian Division Council

The Council of the Australian Division of RINA met on the evening of Wednesday 7 June 2017 by teleconference under the chairmanship of our President, Prof. Martin Renilson in Launceston.

The meeting had a full agenda and some of the more significant matters raised or discussed are outlined as follows:

Survey of Members Expectations

Following consideration of the survey outcome by the June Council meeting, the Committee established to prepare responses is still to report.

AMSA Liaison

Council noted a report of activity to date by the Committee considering this item.

Update of Policy/Procedure Documents

Council agreed in-principle with draft amendments to by-laws guidelines and procedures, and authorised the Secretary to clear their text with HQ in preparation for their approval by the December meeting.

Naval Shipbuilding College

Council agreed to the content of a proposed submission to Minister Pyne (cc Minister Birmingham) regarding the content of courses at the College.

Walter Atkinson Award 2017

Council endorsed the recommendation by the WAA panel that no Award should be made this year.

Linked-In Group

Council noted that the WA Section had established a LinkedIn group with appropriate rules and agreed that the Secretary should liaise with Victoria Section with a view to coordinating the rules of these groups.

Next Meeting of Council

Council agreed to its next meeting being held on Tuesday 12 December 2017.

The draft minutes of the meeting are available to Council members on the Council forum and are available to other members by request to the Secretary.

Rob Gehling
Secretary
ausdiv@rina.org.uk
0403 221 631

Changed contact Details?

Have you changed your contact details within the last three months? If so, then now would be a good time to advise RINA of the change, so that you don't miss out on any of the Head Office publications, *The Australian Naval Architect*, or Section notices.

Please advise RINA London, *and* the Australian Division, *and* your local section:

RINA London	hq@rina.org.uk
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Phil Helmore

VALE

Phil Hercus

It is with sadness that *The ANA* records the passing of Philip Christian Hercus on 3 September 2017.

Phil Hercus was born in Auckland, New Zealand, on 20 December 1942, the first of four children to Beryl and Doctor Macky Hercus. He was educated in Auckland at Avondale Primary School, and then King's College, where he played in the First XI hockey team from Year 3 of high school onwards. He was always interested in boats, and made many models using balsa, as well as playing billiards, tennis, cricket and rugby with his siblings.

The family moved to Sydney in December 1959, and Phil started a BSc degree at the University of Sydney, but he didn't enjoy it and so discontinued. In 1961 he started work as an apprentice shipwright at Halvorsen's Marina at Bobbin Head, but then moved his apprenticeship to Stannard's shipyard at Berry's Bay. John Boulton encouraged him to go to the University of NSW to study the new naval architecture program there, which he did part-time while completing

Phil Hercus

his apprenticeship at Stannards. Around this time he met Jan Clulow, and they married in 1965. He graduated with Richard Caldwell from the University of NSW (now UNSW Sydney) with his Bachelor of Science (Technology) degree in naval architecture in 1968, and the degree was awarded to him with Merit. This was the third class of graduates from UNSW, behind Brian Robson in 1963, and David Hill, John Jeremy and Conan Wu in 1967.

Following graduation, Phil joined forces with John Boulton and Noel Riley and they formed the partnership, Boulton, Riley and Hercus, to provide naval architectural consulting services to the industry. On the partners subsequently agreeing to go their own separate ways in 1973, he started his own company, Hercus Marine Designs, working (like many other start-ups) out of his lounge room at home. Then, after the collapse of the Tasman Bridge in Hobart, in 1977 he went into partnership with Robert Clifford to form International Catamarans. The new company's first vessel, the catamaran *Jeremiah Ryan*, was designed by Phil and built by Robert in a wharf shed on Hobart's Prince of Wales Bay, not far from the current Incat Tasmania site. On the partners subsequently agreeing to go their own separate ways in 1988, he formed his own company, International Catamaran Designs. As Executive Chairman of this company, he steered it to international success with innovative designs, principal among them being the wave-piercing catamaran, and he will be forever remembered as the father of this revolutionary design. At one stage, Incat Designs was the largest provider of naval architectural consulting services in Australia, employing up to thirty-five people, and more than 180 designs were exported worldwide. Many high-speed vessels to Incat Designs were built by such well-known yards as Gladding Hearn, Nichols Bros, A Fai and NQEA, among others.

Phil retired from the business in 2005, with Incat Designs being sold to Crowther Multihulls and US company Alion. The key staff from Incat Designs and Crowther Multihulls were maintained with Brett Crowther as Managing Director, and the Incat name lived on.

The Hales Trophy (officially the North Atlantic Blue Riband Challenge Trophy) is the award for the fastest Atlantic crossing by a commercial vessel. A wave-piercing catamaran designed by Incat Designs and built by Robert Clifford's Incat Tasmania, *Hoverspeed Great Britain,* took the trophy from SS *United States* in 1990, and their subsequent wave-piercers have held it ever since: *Catalonia* in 1998 and, a month later, *Cat-Link V* which holds it today.

Phil's design expertise and achievements in naval architecture have been recognised with major awards from various sectors, including:

- The A.G.M. Michell Medal Award by the Institution of Engineers, Australia in 1992;
- 75th Anniversary Paul Harris Fellow by the Rotary Foundation of Rotary International in 1992;
- Officer of the Order of Australia in 1995;
- Alumni Award by The University of New South Wales in 1995; and
- The Clunies Ross National Science and Technology Award, jointly with Robert Clifford, by the Ian Clunies Ross Memorial Foundation in 2000.

Phil was a Fellow of Engineers Australia, a Member of the Royal Institution of Naval Architects, and a founding member of the Australian Maritime Engineering CRC. He was active in RINA, and served on the Council of the Australian Division of RINA for a number of years. He, more than anyone else, was responsible for the successful formation of the NSW Section of RINA in 1998, became its inaugural Chairman and held that position for five years. Phil's companies, Hercus Marine Design and Incat Designs, gave many young draftsman and naval architects their start in the industry, many of whom went on to form their own design businesses which have kept Australia at the forefront of the high-speed vessel field.

The Sydney Marine Industry Christmas (SMIX) Bash, which is held on board the vessel *James Craig* for the whole marine industry, has now been running for seventeen years. This event was his brainchild, and it was his energy and enthusiasm which got it up and running.

Two of his fondest memories were vessels to his designs winning the Hales Trophy, and his presentation of the President's Invitation lecture to the Royal Institution of Naval Architects in London.

Phil unfortunately had a stroke in 2008 and was subsequently confined to a wheelchair. He was told that he would never walk again, but his spirit wasn't going to accept that, and he worked hard at hydrotherapy and in the gym, and in 2010 a video of him taking his first new steps was posted on YouTube! A month later, he walked 60 m with no help at all. He never lost his sense of humour, his vision, or his love of family and playing croquet.

Phil suffered a heart attack at home on 3 September, and passed away. The funeral service was held in the Magnolia Chapel at the Macquarie Park Crematorium in Sydney, and was attended by about 140 family, friends and members of the naval architecture community, including a number from interstate and overseas, all filling the chapel.

Phil is survived by his wife of 53 years Jan, children Ben and Fiona, grandchildren Tahlia, Joel, Pablo and Isabella, sisters Jenny and Jo, and brother Julian.

Phil Helmore
Ben Hercus

William Boddy

It is with sadness that *The ANA* records the passing of William Raymond Boddy on 14 September 2017 from renal and heart failure, just three months after his younger brother Thomas.

William was born in Sydney on 22 July 1964, the second-youngest of four children, to proud and loving parents, Valma and Thomas (Snr). William could read and write before he went to school, liked building things and drawing boats and planes, putting models of them together, and loved playing with his Meccano set and Hornby train set.

William commenced his career as a draftsman in the Ship Drawing Office at HMA Naval Dockyard Garden Island in 1983 on a four-year apprenticeship. While employed there he enrolled part-time in the Naval Architecture Certificate course at the Sydney Institute of Technology, and graduated in 1989

He then enrolled, again part time, in the Bachelor of

Engineering degree in Mechanical Engineering at the University of Technology, Sydney, and graduated in 1994. This was followed by enrolment in the Bachelor of Engineering degree in Naval Architecture at the University of New South Wales (now UNSW Sydney) and graduated in 2000. He also subsequently completed a Certificate in Complex Procurement Competency with the Department of Defence.

His initial work in the Ship Drawing Office was on emergency refit packages for HMA Ships *Hobart, Brisbane, Adelaide, Canberra* and *Sydney* for future Gulf War deployments. This was followed by preparation of various edit packages and commercial proposals, directing junior staff in a supervisory capacity, and preparation of design packages for FFGs, DDGs, and HMA Ships *Success* and *Jervis Bay*.

Following the formation of Australian Defence Industries (ADI) in 1989, in April 1995 he transferred to the Research Special Projects Group of ADI Design Engineers, and worked on the original tender submission for the Training Helicopter Support Ship project. He then worked on the CIWS and ventilation drawing package for HMAS *Westralia*; CIWS, diesel-generator space ventilation, deck strengthening under the main deck, and flume-tank drawings for HMAS *Success*; galley upgrade, plumbing installation and modifications to the FFGs; and the preparations of various technical specifications for both naval and commercial customers (including lengthening a vessel in dry dock and other merchant ship conversions). He carried out extensive preliminary research of reference and background material pertinent to forthcoming R&D, naval and commercial projects, and assisted in various dockyard tender submissions. He prepared evaluations for building a tug in the dock for Adelaide Steamship Company and helped prepare a submission for the lengthening of the BHP vessel *Iron Monarch*.

In October 1997 William moved to the Submarine Certification Group of the Department of Defence, where he acted as Manager for Certification of submarine components and spares for refit and URDEF (urgent defect) work carried out on HMA Submarines *Otama* and *Onslow*.

In March 1999 he moved to Sofraco Engineering Systems where he worked on the design of the heavy-lift training facility (including the structural design package, installation report, and test and trial procedures), and design calculations for the erection of a slewing-arm davit crane positioned on the Junior Sailors Wharf for HMAS *Cerberus*. He designed and supervised the drafting for the hi-fog fire-suppression systems for HMAS *Westralia*; scoped out and ship checked various design packages for HMA ships and establishments; and supervised structural and mechanical draftsmen on several design drawing packages for HMA Ships *Success*, *Shoalwate*r and *Tobruk*

In February 2000 he moved to Victory Naval Engineering, where he consulted and undertook several small engineering contract packages, both marine and structural, and provided research and technical material for a maritime law case.

In July 2000 he moved to the Maritime Systems Procurement and Contracting Branch of the Defence Materiel Organisation (DMO). His work included complex procurement activities

Bill Boddy
(Photo courtesy Rosalie Reid)

for all RAN ships based on the east and west coasts, including dockings and IMAVs, etc. He acted as the Commonwealth's Technical Representative during negotiations, provides technical advice in relation to naval ship repair and system refit methodology, and participated in procurement planning, contract formation, and contract management activities while assuring policies, processes and procedures.

In September 2011 he moved to the AASSPO (Amphibious and Afloat System Program Office of the DMO as a naval architect, where he prepared and checked various refit packages, proposals and design tasks relating to AASSPO platforms HMA Ships *Success* and *Tobruk*, etc., and performed over 90 novel, complex or critical work tasks in the management of naval architecture projects or sustainment activities assigned to the AASSPO.

In January 2012 he moved to the Materiel Procurement Branch of the Capability Acquisition and Sustainment Group, where he reviewed all higher-delegate submissions for Endorsements to Proceed (ETP)and method of approval for their complex procurement activities; participated in FFGs EMA as a probity for CSB, participated in HMAS *Parramatta* SRA05 for CSB; undertook complex procurement activities for all naval ships based on the east coast; organised the group's Contracting Activity Planning Systems for CSB (East), organised and updated the group's Planning Activity Report, which meant liaising with all Contracting Officers within the group and annotating the latest procurement milestones and gates.

William retired from CASG due to ill health in 2016. During his time with the Departments of Navy and Defence, he worked on many projects and made many friends. He was well respected by all that knew him.

William's funeral service was held at St Stephen's Presbyterian Church at 197 Macquarie Street, Sydney, on 21 September 2017. The service was attended by many of his work colleagues past and present, friends and family. He was buried at Rookwood Cemetery next to his younger brother, Thomas, and will be sadly missed by all who knew him.

He is survived by his sisters Heather and Rosalie, and brother-in-law Robert Reid.

Phil Helmore
Rosalie Reid

NAVAL ARCHITECTS ON THE MOVE

The recent moves of which we are aware are as follows:

Sammar Abbas has taken up the position of Submarine Life Cycle Engineer with ASC Pty Ltd is currently based at ASC West in Henderson, WA.

Sam Abbott returned from his posting as Austal Ships' Technical Manager in the European Office in 2013 and took up the position of Principal Naval Architect with Austal Ships in Fremantle.

Michael Andrewartha has moved on within Veem Engineering and has taken up the position of Principal Engineer in Perth.

Tristan Andrewartha continues as a naval architect with Knud E. Hansen in Copenhagen, Denmark.

Ryan Ayres continues as a Project Manager/Naval Architect with Robert Allan in Vancouver, Canada.

Nick Barratt moved on from Fugro-TSM in 2016 and, after some time at Neptune Marine Services, has taken up the position of Naval Architect with Hanseatic Marine in Perth.

Levi Catton has moved on from ASC and has taken up the position of Engineering Manager with Irving Shipbuilding in Halifax, Nova Scotia.

Dan Curtis has moved on from the Department of Defence and has taken up the position of Seaworthiness Manager with Fincantieri Australia in Canberra.

Raymond Fagerli has completed his Master of Science degree in Maritime Computational Fluid Dynamics at the University of Southampton and has taken up the position of Naval Architect/Hydrodynamicist at McFarlane ShipDesign in Monaco.

Dane Fowler continues as a naval architect in the Initial Survey Section of the Commercial Vessel Survey and Certification Branch or Roads and Maritime Services in Sydney.

Adela Greenbaum, a recent graduate of UNSW Sydney, has taken up a position as a naval architect in The Initial Survey Branch of the Commercial Vessel Survey and Certification Section of Roads and Maritime Services in Sydney.

Tim Hall moved on from Singapore within Lloyd's Register in 2014 to take up the position of Manager, Technical Investigation Department in Southampton, and has now returned to the Sydney office to take up the position of Principal Consultancy Manager Australasia.

Nicholas Kyprianidis has taken up a position as a Periodic Surveyor with the Commercial Vessel Survey and Certification Branch of Roads and Maritime Services in Sydney.

Richard Liley has moved on within Austal Ships and has taken up the position of SEA 1180 Bid Manager in Fremantle.

Bruce McRae has moved on from Veem and has taken up a position as a naval architect with Austal Ships in Fremantle.

Graeme Mugavin has moved on within Roads and Maritime Services and has taken up a position in Special Projects in Sydney, liaising with the Australian Maritime Authority on the Single National Jurisdiction.

Tatiana Nasoufi has taken up a position as a naval architect in the Initial Survey Section of the Commercial Vessel Survey and Certification Branch of Roads and Maritime Services in Sydney.

James Nolan moved on from London Offshore Consultants in 2005 and, after some time at Transport Safety Victoria and BMT Design & Technology, has now taken up the position of Marine Surveyor with BMT Surveys (Australia) in Melbourne.

Dimitrije Radukanovic has taken up the position of Project Engineer Shipping and Transport with Civmec Construction & Engineering in Henderson, WA, and continues consulting as RaduCan.

Simon Robards has moved on within Roads and Maritime Services and has taken up the position of General Manager Industry and Environment/Maritime in Sydney.

Brett Ryall, a naval architecture student at UNSW Sydney, has taken up a part-time position as a naval architect with Ocius Technology in Sydney on the development of the *Bluebottle* unmanned surface vessels while he completes the requirements for his degree.

Leandre Sitja Palomeras has taken a six-month leave-of-absence from his position as a naval architect in the Initial Survey Section of the Commercial Vessel Survey and Certification Branch of Roads and Maritime Services in Sydney in order to spend some time overseas.

Yun Wang, a naval architecture student at UNSW Sydney, has taken up a part-time position as a naval architect with One2three Naval Architects while he completes the requirements for his degree.

This column is intended to keep everyone (and, in particular, the friends you only see occasionally) updated on where you have moved to. It consequently relies on input from everyone. Please advise the editors when you up-anchor and move on to bigger, better or brighter things, or if you know of a move anyone else has made in the last three months. It would also help if you would advise Robin Gehling when your mailing address changes to reduce the number of copies of *The Australian Naval Architect* emulating boomerangs.

Phil Helmore

THE AUSTRALIAN NAVAL ARCHITECT

Contributions from RINA members for *The Australian Naval Architect* are most welcome

Material can be sent by email or hard copy. Contributions sent by email can be in any common word-processor format, but please use a minimum of formatting — it all has to be removed or simplified before layout.

Photographs and figures should be sent as separate files (not embedded) with a minimum resolution of 200 dpi. A resolution of 300 dpi is preferred.

Heeling trials for HMAS *Stuart* (II) on a wet weekend in September 1962. Boat handling arrangements have changed quite a lot in the last 55 years, and the 27 foot Motor Whaler is most likely to be found in a museum today. The man standing on No. 1 deck on the left is long-serving secretary of the Australian Branch/Division of RINA, the late Alan Mitchell. The young man in white overalls on 01 deck leaning on a guardrail is none other than the present Editor-in-Chief of this journal, then apprentice, John Jeremy.

Stuart completed Contractor's Sea Trials in October 1962 and in early 1963 carried out the first firings at sea of the Australian-designed anti-submarine guided missile Ikara. She became the trials ship for the Ikara system when she was commissioned in June 1963 (Cockatoo Dockyard photo in John Jeremy collection)

Ranger-class yachts and Couta boats rafted up in Mosman Bay in Sydney for the Sydney Amateur Sailing Club's Gaffers Day on 8 October
(Photo John Jeremy)

Early 2018

ESSENTIAL MARITIME MANAGEMENT TRAINING PROGRAMS

CONTRACT MANAGEMENT FOR SHIP CONSTRUCTION, REPAIR AND DESIGN

Auckland, NZ: 22-24 January 2018 (Mon. – Wed.)

Sydney, NSW: 31 January – 02 February 2018 (Wed. – Fri.)

Henderson, WA: 7-9 February 2018 (Wed. – Fri.)

Previously attended by over 5000 representatives of 500+ organizations from 28 countries.
Accredited by RINA and SNAME.

FISHER MARITIME
Consulting Group

Consulting Naval Architects and Marine Engineers, Project Managers

CONTRACT MANAGEMENT
FOR SHIP CONSTRUCTION, REPAIR AND DESIGN

Training Program Opportunities
Early 2018

FISHER MARITIME
Consulting Group

Consulting Naval Architects and
Marine Engineers, Project Managers

Dear Colleague:

I am pleased to be able to advise you and your organisation that the well-received 3-day training program, ***Contract Management for Ship Construction, Repair and Design,*** will be available in Auckland, Sydney, and Henderson on the dates shown on the front cover of this brochure. These are open registration presentations of the program that has been previously conducted over 440 times world-wide, including more than 50 times in Australia and New Zealand. Registrations will be limited to about 25 persons per presentation (not more than 12 persons per organisation unless some seats remain available) in order to ensure effective interaction, which is a vital part of the course.

Benefits: This program assists you in defining, understanding and appreciating the most professional manner of managing, controlling, developing and/or using the language of the contract to maximise benefits during ship construction, repair and design. Your participation in this program will assist you by continuing to improve your professional project management skills that are vital to the cost-effectiveness of your work and essential to the long-term success of your organisation.

The benefit of improved contract management is the identification of the pitfalls and traps experienced within the industry. Attendees will be more prepared to identify all the costs and schedule impacts of changes, and to properly assign responsibility for those changes and effects. This will save considerable sums in each major contract. The benefits are estimated at two to three percent of the total value of all contracts managed after the training program.

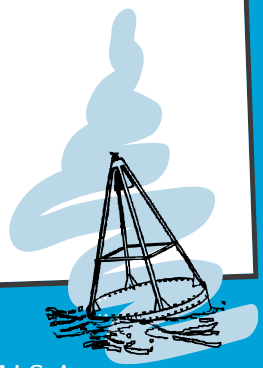
Fees: The open registration fee has been set competitively low in order to give small organizations the economic opportunity to send participants at about the same per-person cost that has been effectively paid by organisations for in-house presentations.

I look forward to having the opportunity to assist your organisation continue to improve the professional skills of you and your colleagues—skills that are vital to the cost-effectiveness of your work and essential to the long-term success of your organisation. Thank you for taking the time to consider this opportunity.

Fisher Maritime Consulting Group

Kenneth W. Fisher

Dr. Kenneth W. Fisher, President



147 Columbia Turnpike, Suite 203, Florham Park, New Jersey 07932 U.S.A.
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Contract Management Training Program

Comments from some prior attendees

The Operator's Perspectives

"The first fresh and rational approach to resolving contract problems, starting with causes and misunderstandings which cost disproportionate amounts of money and time."—N.V., Director, European fleet operator.

"Although I was aware of most of the pitfalls in the overall process of contract establishment and subsequent management, the course's lucid advice provided me with many different concepts, options, and identified the surer way to travel the perilous path. The many anecdotal references illustrated both good and bad practices and the importance of sticking to the basic principles of good preparation and proactive management."—W.R., navy project manager.

"The course provided current policy and pragmatic legal interpretations for conflict resolution. I enjoyed the areas of do's and don'ts of contract negotiation."—L.S.M., ferry operator.

"An excellent balance of very informative material. I feel much more confident in managing a contract. I thought it was the best course I have received while in the Canadian Forces."—A.N., Canadian Dept. of National Defense.

"If you think you know all there is to know about contracting in the marine industry, reserve judgment until you take this course!"—R.O., Canadian Dept. of Nat'l Defense.

"The curriculum touched upon every mistake we made in the past several years, indicating better approaches to solving those problems."—R.B., Project Manager, European fleet operator.

"Great course that makes you look at the contract as a whole whilst still focusing on specific issues that can have great impact. I will be better prepared to manage our contracts from inception to reality."—B.H., N.Z. fishing fleet manager.

"Every topic–without exception–was essential to successful shipyard contract management. Extremely worthwhile."—A.O., ship owner's representative.

"This course should be mandatory for anyone preparing for a new build or upgrade. It was a good refresher for me."—S.H., offshore operator's project manager.

The Contractor's Perspectives

"This training can save a company huge amounts of money which otherwise may have been lost by not understanding a proper business relationship between the owner and the shipyard and the effects of accepting owner's change requests."—S.M., shipyard project manager.

"Most insightful program leading to a better understanding of cost-effective management. I also benefited by listening to other participants sharing their contract problems."—F.G., Project Manager, Canadian shipyard.

"This course is a 'must' for anyone who is involved in contract management. Well structured, systematic approach, supported by endless examples from real life."—T.G., Gen'l Manager, N.Z. custom yacht builder.

"Tremendous overview covering the full spectrum of contract management from pre-contract to post-delivery."—M.G., Ass't Project Manager, major newbuilding shipyard.

"This seminar was an eye-opener. It made me realize how important it was to clear-up contract ambiguities prior to signing."—L.K., Contract Manager, major ship repair yard.

"I benefited greatly regarding the organisation of OFE and OFI. It was very interesting to listen to all the different lessons, taken from reality, in order to avoid those mistakes in the future."—G.W., Exec. Manager, European shipbuilder.

"Excellent seminar. Dr. Fisher's examples and analyses drove home the importance of individual components of the large contract management picture."—B.E., Project Manager, major shipyard.

"Great eye-opener! Dr. Fisher's experience really shows up as he guides you through the jungles of contract misunderstandings."—D.C.R., Project Engineer, major marine vendor.

"For someone in any aspect of the marine business this course should be mandatory. If your attendance was more than 3 years ago, you should attend again."—V.W., shipyard project manager.

"Great benefit to taking course before getting involved with a major contract. Hard to improve."—B.A., Program Manager, major shipyard.

Who Should Attend?

- Project Managers (Yards and Owners)
- Contract Managers and Specialists
- Newbuilding Shipyards, Repair Yards
- Fleet Managers
- General Managers of Shipyards
- Financial Managers (Yards & Owners)
- Ship Conversion Specialists
- Naval Architects, Marine Surveyors
- Federal, State and Public Agencies
- Ferry Operators (Public and Private)
- Naval Shipyards
- Owner's Representatives
- On-Site Representatives
- Major Equipment Vendors
- Marine Superintendents
- Consultants, Attorneys

Lessons Learned —Not Theoretical

This program is a lessons-learned one, not some theoretical course on contract management. It bears a lot of "scar tissue" from marine contractual disasters. It is designed for: (a) project managers who handle day-to-day relations with the other party, (b) persons who form contracts, and (c) senior managers who monitor contract-related resources/cash flow.

"This course should be a compulsory part of any training given to project managers moving into the marine industry. I have certainly benefitted from the change management section as this seems to take up a large portion of my working day.'—L.S., Project Manager, New Zealand yacht builder

'I especially benefitted from the actual problems experienced between shipyards and owners. I also appreciated the in-depth discussions on contract language, contractor point-of-view, contractor management philosophies and negotiation/resolution techniques. Excellent presentation. Well done!'—D.S., Canadian Dept. of National Defense

'The course will furnish the tools to allow you to manage your contracts with significant savings to your firm.'—L.U., Fleet Manager, service vessel

'A must for anyone involved (even remotely) with contract management. Dr. Fisher explains the complex elements of contract management very eloquently by using real life examples.'—Z.H., Canadian Navy

'Comprehensive coverage of all aspects of contract management. Beneficial for Contracts, Program Management, and Senior Technical personnel alike. Our Project Engineers learned many practical do's and don'ts.'—J.M., Engineering Manager, major US shipyard

Your Instructor

Dr. Kenneth Fisher is recognized worldwide as the leading authority on the development and management of complex contracts and specifications for ship construction, conversion, repair and design. He is author of the 2004 RINA publication, *Shipbuilding Specifications: Best Practice Guidelines,* the 2003 SNAME publication, *Shipbuilding Contracts and Specifications,* and the SNAME Signifcant Paper of 2012, *The Impact of Contracts on Ship Design Preparation*. As an arbitrator, expert witness, consultant and instructor for more than 40 years, he brings clarity and organization to an otherwise-complex set of management requirements unique to the maritime industry.

Contract Management for Ship Construction, Repair and Design

3-Day Training Program

Day 1
Project Formation Utilizing Principles of Contract Management

- Unique contracting characteristics of the marine industry
- Principles of contract management applied to the marine industry
- Nine case studies on mis-management of ship repair, construction and design
- Analysis of the causes of mis-management
- Chronology of contracts from formation to close-out after the warranty ends
- Meetings and other pre-contract communications which affect contract workscope
- Defining all of the contract deliverables
- Pre-signing contract management, bid package formation, contract development
- Identification of owner's rep's functional responsibilities throughout performance
- Development of spread sheets to track all contract communications
- Shipyard's development of estimate and bid
- Identification of engineering, regulatory and classification-related responsibilities
- Contract signing, pricing review and schedule review
- Project kick-off meeting agenda items
- Advance development of mechanisms to avoid prolonged disputes

Registration Form Page 6

Day 2
Negotiating, Pricing, Scheduling

- Examples of successful and other changes
- How timing affects the cost of changes
- Identification of real change in workscope
- Change work as a substitute for basic work
- Risk assessment and risk syndication
- Engineering and procurement for changes
- Identification of all involved crafts
- Support services for change work
- Obtaining advance pricing commitments
- Limiting negotiation authority for changes
- Hazardous waste removal change orders
- Identifying the non-obvious scope of work
- Credits for canceled or replaced basic work
- Shipyard's vs. ship owner's estimates
- Choosing a negotiator or negotiating team
- Lead times and durations for change work
- Identifying schedule impacts of changes
- Determining delay entitlement for changes
- Competition for change work
- The shipyard's view on indirect costs
- Identifying overlooked billable personnel
- Estimating change's non-productive effects
- Reliance on OFE/GFE commitments
- Dealing with mandatory changes
- Time and material changes
- Identifying/neutralizing negotiating tactics
- Twelve negotiating techniques
- Use of THE CHECK LIST before making commitments

Day 3
Project Control Through Application of Principles and Proven Techniques

- Translating the contract into routine procedures and communications
- Identifying standards for inspection or rejection of workmanship
- Drawings and bills of material
- Classification and Coast Guard approvals
- Schedule development, monitoring and updating—selecting CPN or Gantt
- Delays—excusable, compensable, non-excused and concurrent
- Responding to failures by the other party to fulfill its obligations
- Owner's review of contractor's drawings
- Review of contractor equipment selections
- Owner-furnished information, equipment
- Management of owner's secondary contracts and yard's sub-contracts
- Early identification of potential disputes and their quick resolution
- Inspection deficiency reports—origination and follow-up
- Distributed change order authority
- Warranty and incomplete items
- Vessel delivery and re-delivery procedures
- Financial and insurance matters
- Monitoring contract deliverables lists
- Closing out the contract

Every 5th Registrant from the same organization is **FREE!**

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001 973 660 1144

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Florham Park, NJ 07932

REGISTER ONLINE
www.fishermaritime.com/register

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TRAINING PROGRAM REGISTRATION FORM

- EARLY 2018 -

FISHER MARITIME Consulting Group

POINT OF CONTACT INFORMATION

Name: _____ Email: _____

Org. Name: _____

Address: _____

City: _____ State/Province: _____ Postal Code: _____

Country: _____ Date: _____

Phone: _____ Fax: _____

REGISTRATION & DISCOUNTS

Registration Fee: _____ No. of Registrants: _____ Team Discount: _____

Early Payment Discount: _____ Total Registration Fee: _____

Contract Management Course:

[ ] Auckland, NZ: 22-24 January 2018 (Mon. – Wed.) $1450.00 (NZD)

[ ] Sydney, NSW: 31 January – 02 February 2018 (Wed. – Fri.) $1350.00 [AUD]

[ ] Henderson, WA: 7-9 February 2018 (Wed. – Fri.) $1350.00 [AUD]

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PAYMENT IS DUE WITH REGISTRATION
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10% TEAM DISCOUNT
- AND -
Every 5th registrant from the same organization attends
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2) Name: _____ Email: _____

3) Name: _____ Email: _____

4) Name: _____ Email: _____

5) Name: _____ Email: _____

EARLY PAYMENT DISCOUNT: An $50 discount applies if payment is received at least one month prior to the first day of the program attended by the registrant(s).

TEAM FEE DISCOUNT: A $110 discount per person applies when 2 or more people from the same organization attend the same program, date and city. ON-SITE programs are cost-effective for 7 or more persons.

LOCATION: All programs are held at convenient industry locations. Registrants will be advised of the specific venues.

FEE: The tuition and registrations, payable in advance, is shown above. This includes the cost of all workbooks, program materials and refreshments (luncheons not included).

CANCELLATIONS: All cancellations must be in the form of a written notice. Registrations cancelled at least 14 days before the first day of the program are subject to a $75 cancellation fee. Registrations cancelled 7-13 days before the first day are subject to a $150 cancellation fee. Registrations cancelled 3-6 days before the first day are subject to a $300 cancellation fee. Registrants who do not attend or who cancel less than 3 days before the program will receive copies of program materials but no refund. In the event of a cancellation of a program for any reason, our liability is limited to the return of the registration fee.

TRANSFERS/SUBSTITUTIONS: There is no charge for transfers or substitutions; however, the cancellation policy stated above applies equally.

EMAIL: We recommend you fax this form since we can not guarantee the security of your credit card information when transmitted over email.